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MTC's Resolution 3434 Transit-Oriented Development Policy

Interim Evaluation

Report prepared for:



METROPOLITAN
TRANSPORTATION
COMMISSION

By:

Nelson | Nygaard
consulting associates

In association with:

Arup
Community Design + Architecture
Design, Community and Environment
Fehr & Peers Associates
Reconnecting America's Center for
Transit-Oriented Development
Strategic Economics

and:

Association of Bay Area Governments



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Executive Summary

MTC's Transit Oriented Development Policy, adopted in July 2005, aims to capitalize on investments in new transit corridors in the region by promoting the development of vibrant, mixed-use neighborhoods around new stations. The policy has three key elements:

- Corridor-level thresholds to quantify appropriate minimum levels of development around transit stations along new corridors
- Local station area plans that address future land-use changes, station access needs, circulation improvements, pedestrian-friendly design, TOD-supportive parking policies and other key features in a transit-oriented development
- Corridor working groups that bring together CMAs, city and county planning staff, transit agencies, and other key stakeholders

The TOD Policy is the first of its kind by a Metropolitan Planning Organization or other regional agency in the United States. Partly for this reason, Commissioners specified that MTC staff should “conduct a review of the TOD policy and its application to each of the affected Resolution 3434 corridors, and present findings to the Commission, within 12 months of the adoption of the TOD policy.” This report presents the findings from that evaluation.

Ridership Impacts of TOD

One of the main aims of the TOD policy is to promote system efficiency, by ensuring that future transit extensions maximize ridership and productivity. The research reviewed for this evaluation provides a large body of evidence to support this link. A recent comprehensive review of TOD in the United States for the Transportation Research Board (TRB) called the ridership benefits of TOD “unassailable.” Based on data from the Bay Area; Washington, DC; Portland, OR; and San Diego, it concluded that well-designed, mixed-use development around transit nodes can boost patronage as much as five to six times higher than comparable development away from transit.

Higher densities, reduced parking and constrained or properly priced auto infrastructure help to amplify TOD's ridership benefits. TOD also promotes system efficiency by generating transit trips at off-peak times or the reverse-peak direction when the marginal cost of accommodating them can be close to zero; and minimizes capital and operating costs for park-and-ride or feeder transit. For example, BART's analysis of the Lake Merritt-Fremont line found that TOD has the potential to generate about 1.76 times the number of daily boardings as in the AM peak period, helping to generate a significant volume of off-peak ridership.

Corridor Thresholds

One of the most important conclusions of this evaluation is that the corridor thresholds are achievable. Detailed analysis undertaken with input from local planning staff has confirmed that all corridors can meet the housing unit thresholds. In some corridors, meeting the thresholds has not required any change to local land-use policies, although in other corridors this requires continued planning and a commitment to adopt new station area plans and zoning (Figure ES-1). While concern has been expressed in some corridors that MTC is forcing urban density on suburban jurisdictions, this is simply not the case – the thresholds can be met with only moderate increases over existing allowable densities, even assuming that some stations on each corridor will accommodate little or no new development due to land-use conflicts. Much of this planning is underway or could be undertaken through an expansion of MTC's station area planning grant program.

The level of planning and implementation effort necessary to meet the thresholds varies between the corridors. Some corridors have a straightforward path to meeting the thresholds – Dumbarton Rail, for example, is expected to meet the thresholds with new development under construction, and once the Redwood City Downtown Precise Plan is adopted (scheduled for late 2006). Other corridors such as SMART have the opportunity to meet the thresholds with longer-term development coupled with focused planning efforts in some station areas.

The ferry corridors represent a special case, which is being considered through more detailed work in association with cities seeking to establish ferry service.

Figure ES-1 Resolution 3434 Corridor Performance

Corridor	Threshold (Housing Units per Station)	Achieved with current development?	Achieved with current development plus adopted plans?	Achieved with TOD scenario?
BART East Contra Costa Rail Extension (eBART)	2,200	No	No	Likely with long-term TOD, pending Ridership Development Plans
BART – Downtown Fremont to San Jose/Santa Clara (SVRT)	3,850	No	No	Yes , with moderate TOD
AC Transit Berkeley/Oakland/San Leandro Bus Rapid Transit: Phase 1	2,750	Yes	–	–
Caltrain Downtown Extension/Rebuilt Transbay Terminal	2,200	Yes	–	–
Muni Third Street Light Rail Transit Project Phase 2 – New Central Subway	3,300	Yes	–	–
Sonoma-Marin Rail (SMART)	2,200	No	No	Yes , with long-term TOD
Dumbarton Rail	2,200	No	Likely , provided that Redwood City Downtown Precise Plan is adopted	–
Expanded Ferry Service	750	Varies.* Terminal sites that do not currently meet the threshold have not yet been analyzed in enough detail to determine potential.		

*Depends on ferry terminal sites considered (e.g. in places such as Richmond where there are alternative sites in the Marina and on the Ford Peninsula), and whether they are analyzed as a corridor or not.

Methodological Issues

MTC and ABAG need to agree on a clearer process to define and certify compliance with the TOD policy threshold. There are several methodological issues related to counting future housing units and the affordable housing bonus. These have been resolved using professional judgment in this evaluation; however, clearer guidelines and a process for ongoing monitoring will avoid potential future disagreements over whether a corridor meets the housing threshold.

Affordable Housing

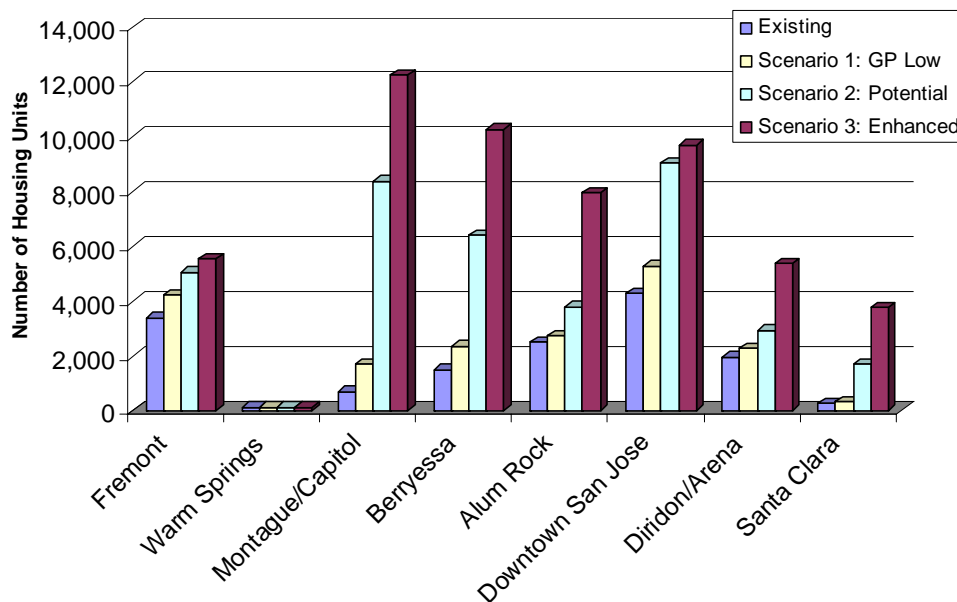
An important aim of MTC's TOD policy was to catalyze the development of affordable housing in station areas. To this end, MTC's policy states that new below-market housing units will receive a 50% bonus toward meeting the corridor threshold, subject to income thresholds. It is too soon to tell, however, whether this incentive is having an impact on local land-use and affordable housing policies. At present, most local jurisdictions appear to be relying on their existing inclusionary housing policies to receive the bonus.

Land Use Conflicts

The analysis for the SMART and SVRT corridors has revealed numerous land-use conflicts at individual stations. At certain stations, particularly Warm Springs, no net new residential units are assumed due to pre-existing industrial uses. Some of these issues have been encountered in MTC-funded Station Area Plans; at Fairfield, for example, approximately one-third of the planning area has been identified as significant habitat for special-status species.

The analysis, however, has also revealed the strength of the corridor concept in determining compliance with the MTC TOD policy. None of these land-use conflicts mean that the corridor is unable to meet the housing unit threshold, as underperforming stations can be countered by other stations along the line which provide more than the minimum amount of housing. For example, Figure ES-2 shows how the SVRT corridor can meet the housing threshold even with no new housing at Warm Springs. Indeed, land-use conflicts were factored in when setting the housing minimums per corridor. The TOD policy can also be used as a tool to influence station siting, encouraging stations to be located where they maximize the opportunity for new development.

A related issue is industrial land preservation, which has been addressed by the MTC-ABAG Joint Policy Committee (JPC). In May 2006, the JPC expressed concern that much of the housing production to meet the TOD policy threshold might be achieved through conversion of industrial land, and asked MTC to consider the extent to which this was taking place. To date, however, it appears that all planned conversions are a result of wider community-based planning efforts or are market driven, and in no instances are attributable to the MTC housing unit threshold.

Figure ES-2 Corridor Housing Comparison

Land Banking

Land banking is an issue that has yet to be fully addressed. Concerns have been raised that the lack of certainty over transit extensions has prevented local jurisdictions from achieving the maximum potential for housing units, due to developer or community fears that the transit will never materialize. Land banking may provide one mechanism to address this, provided that the transit agency has a policy that provides for subsequent development on surface parking facilities. More detailed work on this issue will be undertaken this year in the SVRT corridor. Preliminary evidence from station area plans is that communities are finding a range of reasons to build walkable neighborhoods with a sense of place, even in advance of the transit extension. However, regions that have made recent investments in transit extensions, such as Minneapolis, have found that the land-use response is far greater once the transit investment is built or made certain.

Employment Thresholds

This evaluation concludes that employment thresholds are not appropriate. Cities already have considerable incentives to zone for non-residential uses, such as sales tax revenue and reduced fiscal impacts. Many are already planning for significant employment around transit lines. Moreover, employment uses work best in promoting transit ridership when they are concentrated at key hubs at higher densities, rather than dispersed through a corridor. Finally, there is a compliance problem with employment thresholds. Jobs are difficult to quantify and highly flexible. For example, an office complex that might accommodate up to 1,000 employees may, for long periods, house only a fraction of that total. This makes certification of employment thresholds extremely difficult and costly.

This suggests an increased focus on employment in specific station area plans, rather than a corridor-level threshold which in any case would need to be matched to local estimates of market demand. MTC should ensure that station area plans make provision for employment levels that are consistent with market assessments.

Experience in Other Regions

A review of experience in other regions also shows that the TOD thresholds are feasible and are significantly below the level of development that has already been achieved in other parts of the United States. The case studies reviewed for this evaluation (Figure ES-3) indicate that TODs in other regions are generally reaching the MTC threshold with current development alone, without considering future potential.

Figure ES-3 TOD Performance in Other Regions

System	Average Housing Units/Station	Equivalent MTC TOD Policy Threshold	% Difference from TOD Policy Threshold
New Jersey – Hudson-Bergen Light Rail	7,063	3,300	+ 114%
New Jersey – Transit Villages	3,558	2,200-3,850*	+ 39%
Chicago – Evanston	4,192	2,200	+ 91%
Arlington County – Rosslyn Ballston Corridor	5,022	3,850	+ 30%
California – Various examples	3,113	2,200-3,850*	-4%

*Various depending on station. Note that percentage differences for New Jersey Transit Villages and California are weighted based on the thresholds that would apply to individual stations, dependent on the transit technology.

Corridor Working Groups

Overall, it is still too soon to fully evaluate the success of the Corridor Working Groups. Corridor planning has not yet reached the stage where potentially difficult decisions regarding allocation of housing units to individual stations need to be taken.

The preliminary conclusions from this evaluation suggest that Corridor Working Groups have the potential to be highly valuable. However, there is little incentive for Corridor Working Groups to continue to meet once there is a clear path to ensuring that the housing thresholds are met. There are several additional functions that the Corridor Working Groups may be able to assume going forward:

- A role in determining potential incentive funding (discussed below).
- Determining how to maximize ridership and meet other criteria such as farebox recovery.
- A role in planning access improvements to the stations through a MTC-funded Corridor Strategic Plan. This plan would also be valuable in determining the function of each station – in particular, where employment and retail uses are to be concentrated along a corridor, and the distribution of park-and-ride provision.

Station Area Plans

MTC awarded station area planning grants to eight local jurisdictions and transit operators as part of the pilot cycle, in order to enable the success of the program to be evaluated. None of the plans has been completed so far, or even reached the stage where lessons can be drawn from the station area planning program as a whole. However, several grant recipients have noted the supportive influence of MTC's TOD policy on their planning efforts. More broadly, it is clear that the TOD policy as a whole is changing the way in which local jurisdictions think about and plan for their stations, focusing their attention on station area development and access, and calling attention to the need for land-use intensification in station areas.

Some initial conclusions can be reached regarding the success of station area plans and potential refinements:

- **Importance to TOD policy.** Station Area Plans are emerging as critical to the TOD policy, and preliminary results regarding the range of densities and land-use concepts being considered are encouraging. They provide the means to address a range of issues, including parking and access for people with disabilities, and qualitative issues for which numerical thresholds are not appropriate. Local jurisdictions would be unlikely to be able to fund the plans on their own, and the grants demonstrate that MTC is not promoting unfunded mandates, while ensuring that the planning work is completed.
- **Future planning cycles.** Any decision on future planning cycles should await firmer results from the first set of MTC-funded plans. However, depending on funding availability, MTC should consider requiring station area plans for all stations on the Resolution 3434 corridors – even if the housing threshold has been met – in order to address pedestrian access, parking and other issues.
- **Planning area.** While the TOD policy threshold should still apply to the ½-mile radius, future station area plans should be able to encompass a wider area if appropriate, particularly for consideration of access improvements.
- **Additional topics to include.** Topics which might be usefully incorporated into future cycles include transportation level of service (LOS) standards; a review of permitting and design review procedures; and an explicit examination of the tradeoffs between parking, new development and access improvements.
- **Integration with other efforts.** Station area plans can tie into initiatives such as Focusing Our Vision, which builds on the regional Smart Growth Strategy/Regional Livability Footprint Project. To assist in this integration, one option is for ABAG to assume responsibility for oversight of future station area plans.

Parking is an area that MTC will need to monitor closely, given that TOD-specific parking ratios will be critical to maximizing ridership. As discussed in Chapter 2, the ridership benefits of TOD largely accrue from car-free and single-car households. The scopes of work of all the station area plans include a parking analysis, and MTC's separate regional

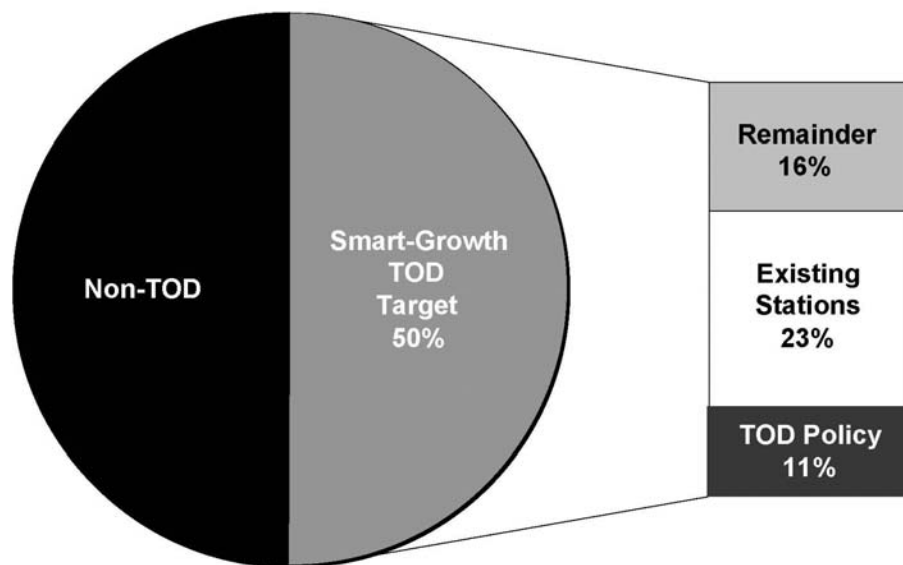
parking study will provide additional resources and data to support planning efforts. At this stage, however, it is too early to determine how parking is being addressed in station area plans.

Incentives for Additional Housing

The housing unit thresholds are achievable for all the Resolution 3434 corridors. Assuming that raising the threshold is not an option, in order to avoid “moving the goalposts” on transit operators and local jurisdictions, MTC may be able to provide incentives to spur corridors to go above and beyond the minimum number of housing units.

As was discussed during the development of the TOD policy, it should be remembered that the Resolution 3434 transit extension corridors – even under MTC's housing thresholds – will only account for 11 percent of regional growth in population through 2030. Nearly twice as much growth will occur around the existing transit network, according to ABAG's Projections (Figure ES-4).

Figure ES-4 Projected Growth to 2030



In some station areas, local jurisdictions are planning to significantly exceed the housing unit threshold. However, some others appear to view them as a target level that is to be reached but not surpassed. MTC should consider a layered system of incentives for planning, achieving the thresholds and surpassing them. Regardless, additional regional support for training and technical assistance would be valuable and help station areas maximize their potential. These incentives could be introduced at the corridor and/or the station level, with Corridor Working Groups able to direct a portion of funding to allow access improvements at stations that do not meet the station-level thresholds.

Incentives can also help reduce the potential for cities to reverse land-use decisions. Rather than punitive sanctions to deter cities from reversing land-use decisions (for example, on election of a new city council), these incentives can help reward cities that maintain TOD zoning policies. If some incentives are payable only on groundbreaking of new units (for example, through a strengthened Housing Incentive Program), the risk of non-compliance is avoided.

The most obvious mechanism to provide these incentives is to redirect regional funding to reward local jurisdictions and corridors that significantly exceed the thresholds. Station area plans are likely to identify feeder transit, pedestrian and bicycle improvements that cannot be funded by existing programs, which would benefit from such incentive payments. Funding sources could include the following:

- **SuperHIP** – an expanded version of MTC's successful Housing Incentive Program (HIP), which provides additional funding to local jurisdictions that approve new housing close to transit stops. Eligible uses of funds include bicycle, pedestrian and traffic calming projects, and transit stop amenities.
- **Other funding for access improvements.** This could include operating funds for shuttles, and/or capital funds for bicycle and pedestrian amenities, based on a Corridor Working Group strategic plan.
- **Housing funds.** The partnership with ABAG offers the opportunity to steer housing funds to station areas – such as the State affordable housing bond which will be on the ballot in November 2006.

Other Conclusions

MTC's TOD policy complements other policies that promote transit ridership. By focusing specifically on housing and station area planning, MTC's TOD policy complements other policies that govern new transit investments. For example, BART's System Expansion Policy and various farebox recovery requirements are intended to ensure that transit extensions generate sufficient ridership, and help to ensure that corridors plan for access beyond the ½-mile station area. However, since these thresholds can be met through park-and-ride and feeder transit provision, they do not necessarily mean that TOD and pedestrian access will be given priority. MTC's TOD policy may also provide incentives to relocate stations in the optimal location to encourage TOD, although corridors have not yet reached this iteration of planning.

Meeting TOD policy goals represents only part of the effort needed to ensure new transit extensions maximize ridership. For corridors that are not subject to external farebox recovery or ridership requirements, MTC could consider introducing a separate threshold to ensure a minimum level of system efficiency. Alternatively, MTC could provide Corridor Working Groups with the tools and funding to help them maximize ridership. This might include corridor strategic planning; application of the direct ridership model to analyze the tradeoffs between park-and-ride, other access modes and station area development; and

development of a station typology to indicate the roles of each station within the corridor (e.g. employment center, park-and-ride node or residential center).

It is too early to analyze the full implications of the TOD policy. All corridors are making good progress towards meeting housing thresholds, and station area planning grant recipients have embraced the challenge of planning for TOD. However, since none of the corridor housing thresholds have been certified, nor station area plans completed, it is not yet possible to evaluate the extent to which these plans fulfill both local and regional goals.

Chapter 1. Introduction

MTC's Transit Oriented Development Policy, adopted in July 2005, aims to capitalize on investments in new transit corridors in the region by promoting the development of vibrant, mixed-use neighborhoods around new stations. It aims to stimulate the construction of at least 42,000 new housing units along the region's major new transit corridors, helping to ease the Bay Area's chronic housing shortage and preserve regional open space, while at the same time improving the cost-effectiveness of regional investments in new transit expansions.

The TOD Policy is also the first of its kind by a Metropolitan Planning Organization or other regional agency in the United States. While many regions are seeking to promote transit-oriented development and reduce sprawl, there are very few that have sought to tie transportation funding to land-use decisions in the same way as MTC.¹ Partly for this reason, Commissioners specified that MTC staff should "conduct a review of the TOD policy and its application to each of the affected Resolution 3434 corridors, and present findings to the Commission, within 12 months of the adoption of the TOD policy."

This report presents the findings from that evaluation, addressing some of the key issues raised by Commissioners and other stakeholders. It brings together the results of various discrete tasks, including:

- **Intensive land-use analysis of the SVRT and SMART corridors.** Working with ABAG, local jurisdictions, county agencies and transit agencies, the team developed detailed analyses of existing development within one-half mile of proposed stations, and future scenarios involving different levels of transit-oriented development.
- **Refined analysis of other corridors.** ABAG developed refined and updated analyses for the Resolution 3434 corridors that did not originally meet the housing thresholds, based on census information and demographic data from Projections 2005.
- **Station Area Planning progress reports** submitted by grant recipients, which provide

MTC Resolution 3434 Transit-Oriented Development Policy for Regional Transit Expansion Projects

The full text of MTC's TOD policy is attached as Appendix A. In summary, the policy has three key elements:

- Corridor-level thresholds to quantify appropriate minimum levels of development around transit stations along new corridors
- Local station area plans that address future land-use changes, station access needs, circulation improvements, pedestrian-friendly design, TOD-supportive parking policies and other key features in a transit-oriented development
- Corridor working groups that bring together CMAs, city and county planning staff, transit agencies, and other key stakeholders

¹ Case studies of transit-oriented development in other regions were reviewed as part of the Phase 1 TOD study, which led to the adoption of the MTC policy. See www.mtc.ca.gov/planning/smart_growth/tod/deliverables/2.pdf.

a status report on planning activities to date.

- **Case studies** of transit-oriented development in other regions, including Chicago, New Jersey and Washington, DC. In contrast to the peer examples prepared for the Phase 1 study, which focused on policy mechanisms to encourage TOD, these case studies focus on the level of development which other communities have achieved close to transit.
- **Outreach and discussions** with staff at regional agencies, transit operators, local jurisdictions and non-profit organizations.

One of the main conclusions of this report is that it is still too early to understand the effectiveness of the policy. Therefore, this report should be considered an interim evaluation, rather than the “final word” on the effectiveness of the TOD policy.

Chapter 2. Does TOD Work?

One of the underlying rationales for MTC's TOD policy was to improve the region's return on investment for transit expansions. By increasing the amount of development close to transit, MTC can help to maximize transit ridership and productivity. At the same time, the policy uses transit funding to achieve wider regional goals – notably providing more transportation choices for the region's residents by focusing development in station areas, and increasing housing opportunities.

This chapter addresses the fundamental question of the impact of transit-oriented development on transit ridership. It summarizes the results of previous research projects, and presents a modeling analysis undertaken for this study.

The results in this chapter are largely based on disaggregate survey data, which model the travel choices made by individuals. Evidence on the ridership benefits of TOD also comes from case studies of TOD. These are presented in Appendix B; in summary, communities such as Arlington County have experienced far greater ridership at TOD-focused stations, compared to other stations on the same line where park-and-ride facilities have been the dominant use of station area land.

Impact on Transit Ridership

A recent comprehensive review of TOD in the United States for the Transportation Research Board (TRB) called the ridership benefits of TOD “unassailable.”¹ Based on data from the Bay Area; Washington, DC; Portland, OR; and San Diego, it concluded:

On balance, research to date shows that TOD yields an appreciable ridership bonus: well-designed, mixed-use development around transit nodes can boost patronage as much as five to six times higher than comparable development away from transit.²

To some extent, this is caused by self-selection – i.e., residents who prefer to ride transit are drawn to live in TODs. The TRB report estimates that upwards of 40% of the ridership bonus is caused by self-selection. From a policy perspective, however, this matters little, as TOD can provide opportunities to live near transit for those who desire.

Several studies, however, have concluded that the ridership benefits of TOD can be amplified by several factors, including:

- **Higher density.** Controlling for other factors, an increase in density of 10 units per gross acre equates to a 3.7% increase in transit mode share.³ Higher density therefore

¹ “Given the preponderance of evidence, the ridership benefits of TOD are unassailable.” Cervero, Robert et. al. (2005), *Transit-Oriented Development in the United States: Experiences, Challenges and Prospects*. TCRP Report 102. Washington, DC: Transportation Research Board, p. 157.

² Ibid., p. 139.

³ Ibid.

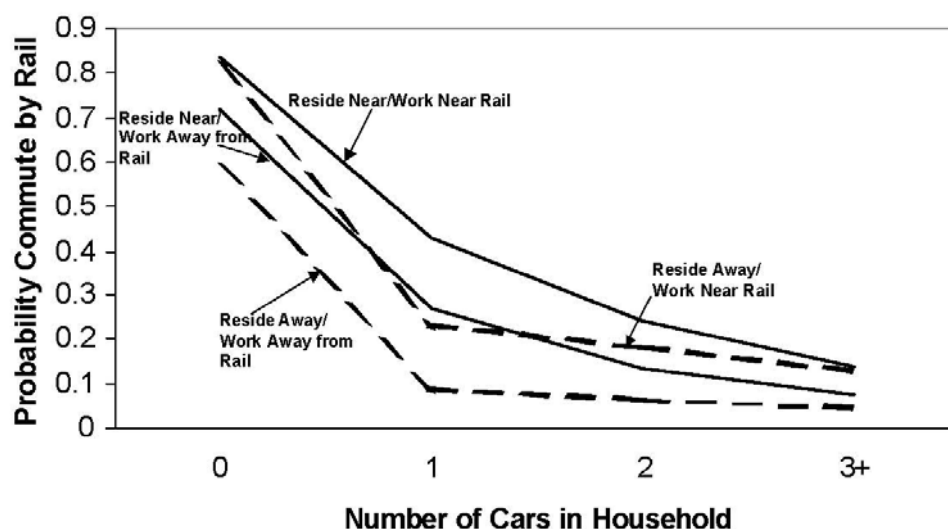
brings a double ridership bonus – more people living or working close to transit, and a higher proportion of these people riding transit.

- **Reduced parking.** The ridership benefits of TOD accrue primarily from households with fewer than two vehicles, according to the TRB study.⁴ Other studies have found that the supply of parking – and whether or not it is provided free of charge – is a critical factor in determining transit usage. Figure 2-1 shows that the probability of commuting by rail diminishes rapidly as household vehicle ownership increases.
- **Constrained or properly priced auto infrastructure.** A new report for Caltrans and the Federal Highway Administration concludes that TOD has the greatest impact on transit ridership where scarce station area land is prioritized for new development, pedestrians and transit. “Developing suburban light rail stations with ample parking and wide streets is not likely to affect alternative mode use nearly as much as redeveloping an infill residential location with good bus service,” it concludes.⁵

A recent California study at Cal Poly Pomona and UC Berkeley found that TOD residents are five times as likely to use transit for commute trips, compared to residents in the surrounding city (Figure 2-2). The ridership benefits of TOD are more pronounced for Bay Area TODs, particularly those on the BART system, compared to Southern California examples.

TOD employees are also likely to use transit more, compared to employees in the surrounding cities, the researchers found (Figure 2-3). However, this effect is not as strong as for TOD residents, and is highly dependent on the supply and cost of parking.

Figure 2-1 Vehicle Ownership Impact on Rail Commuting



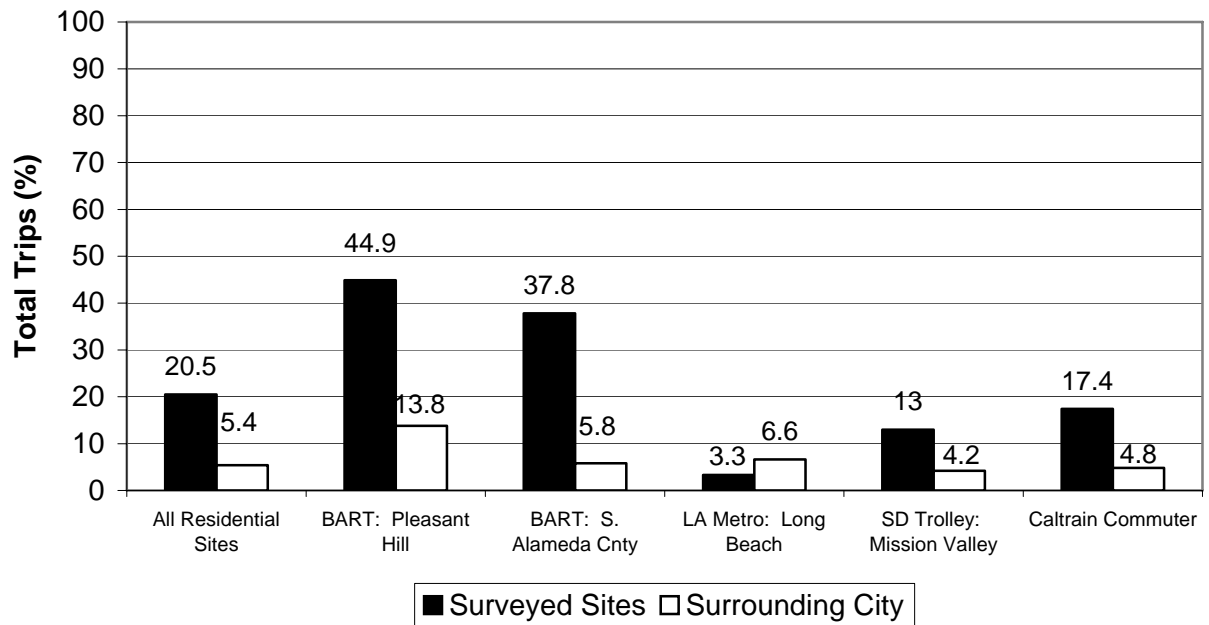
Note: Reside Near = 1/2 mile or less; Work Near = 1/2 mile or less.

Source: Cervero & Duncan, 2002

⁴ Ibid.

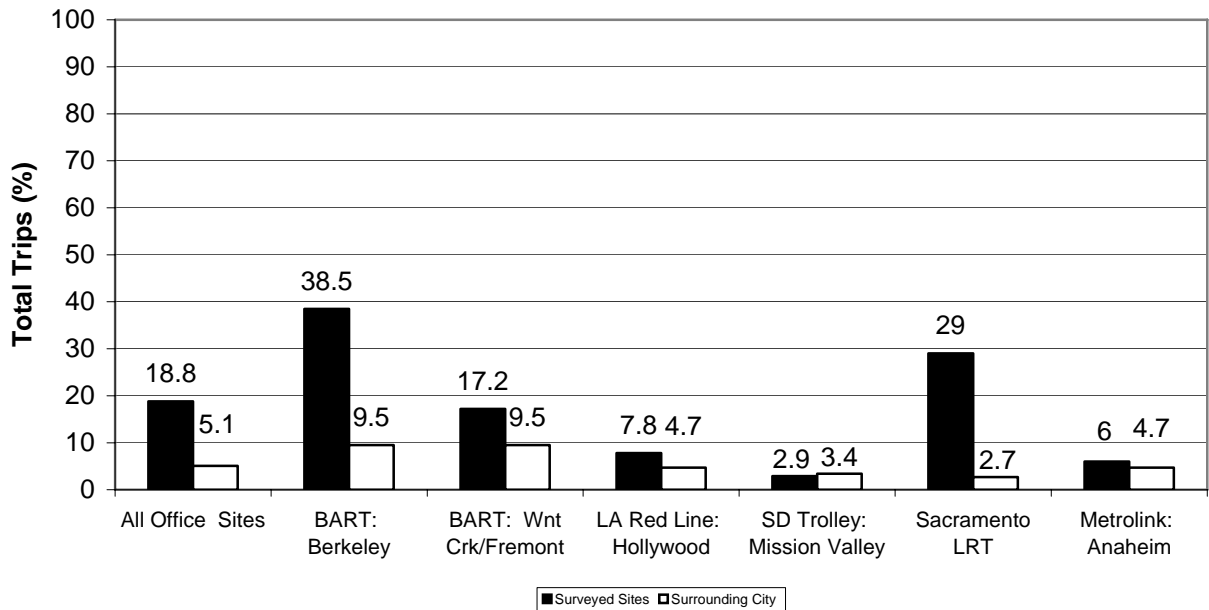
⁵ Chatman, Daniel (2006), *Transit-Oriented Development and Household Travel: A Study of California Cities*, Draft Final Report, February 2006.

Figure 2-2 TOD Residents' Transit Mode Shares



Source: Lund, Cervero & Willson, 2004.

Figure 2-3 TOD Employees' Transit Mode Shares

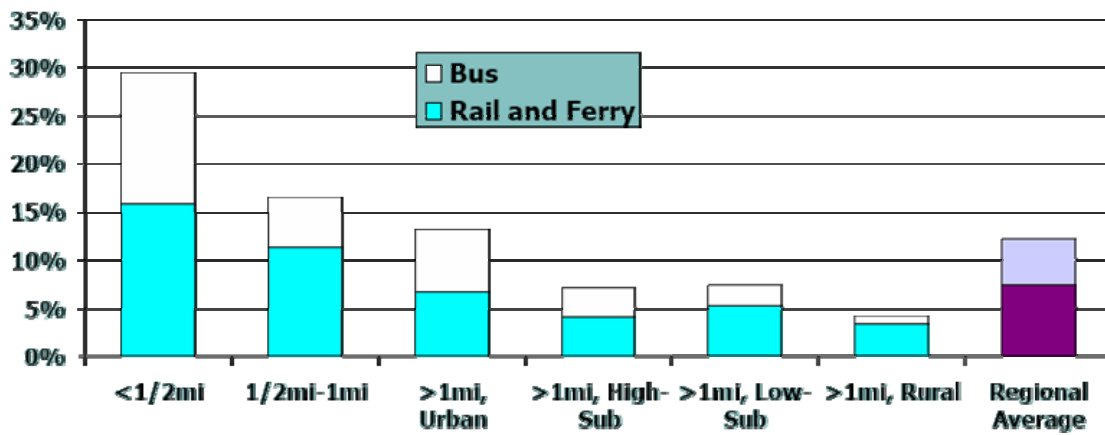


Source: Lund, Cervero & Willson, 2004.

In the Bay Area, an analysis conducted by MTC staff came to similar conclusions using a different data set – the 2000 Bay Area Travel Survey. This compared the demographic and travel patterns of TOD and non-TOD residents; it also looked at residents living between 0.5 and 1 mile from rail stations, as well as those within the 0.5-mile radius. The key conclusions are:⁶

- TOD residents drive less, ride transit more and own fewer cars. Compared to the regional average, Bay Area residents who live within ½ mile of a rail station or ferry terminal:
 - Were three times as likely to have used transit at least once during the survey period
 - Are more than twice as likely to take transit to work – Figure 2-4 shows mode shares for different types of residents.
 - Are more than three times as likely to bicycle or walk to work
 - Drive nearly 50% less
- Transit ridership is greatest at urban TODs (with densities of more than 10,000 people per square mile), particularly in terms of bus ridership in a station area. However, the ridership benefits of TOD are still evident at suburban stations (Figure 2-4), although much will depend on the pedestrian network and cost of parking in these settings.
- The greatest transportation benefits are found within the ½-mile radius from a rail station or ferry terminal. However, residents in the 0.5-1 mile radius also tend to drive less and ride transit more, compared to those in more distant locations.
- The location of both home and workplace are important determinants of transit ridership. As shown in Figure 2-5, transit is used by nearly one-third of Bay Area workers (excluding those who work in San Francisco) who both live and work within ½ mile of a rail station or ferry terminal.

⁶ Gossen, Rachel (2005), *Characteristics of TOD and non-TOD Residents*. Presentation to Joint Policy Committee, November 2005.

Figure 2-4 Transit Shares: Home-Based Work Trips

Source: Gossen (2005). Categories refer to distances from rail station or ferry terminal.

Figure 2-5 Commute Mode Share by Proximity to Transit

Proximity of Home to Rail/Ferry	Proximity of Work to Rail/Ferry		
	Within ½ mile	Greater than ½ mile	Total
Within ½ mile	31%	14%	19%
Greater than ½ mile	11%	4%	5%
Total	13%	4%	6%

Source: Gossen, 2005. Excludes those who work in San Francisco.

Non-Work Trips

TOD also promotes ridership for non-work trips. The Cal Poly/UC Berkeley study found that transit accounts for 14-15% of non-work trips for the BART TODs studied, and 5% on Caltrain.⁷ This is important from a transit-efficiency perspective, as these trips tend to take place at times of day when capacity is not an issue, and the marginal cost to the transit operator is often minimal. It is also important for regional traffic management reasons, since non-work trips represent 80% of total trips.

These findings are echoed by various other studies. For example, BART's analysis of the Lake Merritt-Fremont line found that TOD has the potential to generate about 1.76 times the number of daily boardings as in the AM peak period.⁸ Many other non-work trips, meanwhile, are made on foot or by bicycle.

⁷ Lund, Hollie; Cervero, Robert; and Willson, Richard (2004), *Travel Characteristics of Transit-Oriented Development in California*. Final Report, January 2004.

⁸ BART A-Line Study, Final Report. September 2005.

Boundaries of TOD

One subject of considerable discussion in the literature relates to the boundaries of transit-oriented development; i.e., the distance from the stop or station at which the ridership benefits are most evident. There is a clear consensus that there is a steep drop-off in ridership beyond the ½-mile radius for rail stations. For example:

- Analysis of Bay Area Travel Survey data finds that transit commute mode share is 29% for the ½-mile radius, and just 16% for the ½-mile to 1-mile “donut” around a station, as shown in Figure 2-4. The gap is narrower when rail ridership alone is considered; however, these data include access trips by auto and feeder bus, as well as those on foot (Gossen, 2005).
- An earlier analysis of the Bay Area Travel Survey dataset tested various radii from the station against ridership, including ¼-mile and 1-mile. At the residential end, the results “suggest a ½-mile radius is most strongly associated with ridership.”⁹ For employment, the study found: “Coefficients suggest a gradient effect, with the likelihood of rail-commuting greatest for workplaces within 1/4 mile of a rail stop and higher for the 1/4 to 1/2 mile ring than the suppressed category of 1/2 mile and beyond.”¹⁰
- A study of BART, CTA and Metra systems found that the *maximum* distance in which walk access predominates is 0.5-0.75 miles at the home end, depending on the agency.¹¹
- A synthesis of access studies found that most passengers (75-80% on average) walk ¼-mile or less to bus stops, with this distance doubled for rail transit.¹²

Direct Ridership Modeling

Another method of analyzing the ridership impacts of transit-oriented development comes from new modeling methods. These direct ridership models also provide an important way to quantify the different trade-offs in station area planning – for example, through analyzing how much feeder bus service or how many residential units are needed to generate as many riders as a commuter parking space. MTC is making available a spreadsheet version of the model, which can be used in future station area planning and corridor planning efforts.

The full results from the modeling are shown in Appendix C. Some of the conclusions include:

- High-density residential development can generate as much ridership as park-and-ride facilities. Nearly 3.5 residents, or between one and two dwelling units, have the

⁹ Cervero, Robert and Duncan, Michael, *Residential Self-Selection and Rail Commuting: A Nested Logit Analysis*, Working Paper, University of California Transportation Center, December 2002, p. 13.

¹⁰ Ibid., p. 17.

¹¹ TCRP Report H-1 cited in Kuzmyak, J. Richard et. al. (2003), *Traveler Response to Transportation System Changes. Chapter 15 – Land Use and Site Design*. TCRP Report 95, Washington, DC: Transportation Research Board.

¹² Kittelsen & Associates et. al. (2003), *Transit Capacity and Quality of Service Manual*. 2nd Edition. TCRP Report 100. Washington, DC: Transportation Research Board, p. 3-9.

same ridership benefit as a commuter parking space. Since a parking space requires approximately 350 square feet, TOD development must be high-density – one resident per 100 square feet or 400 residents (about 150 to 200 dwelling units) per acre – to fully overcome the loss of parking, all else equal. TOD also serves to reduce the auto access mode share.

- The combination of TOD and feeder bus service can also generate as much ridership as commuter parking, at lower densities. 0.6 residents must be added to compensate for the negative ridership effect of removing one parking space if feeder bus service to the station is simultaneously increased. Again assuming 350 square feet per parking space, TOD development need only be moderate density – one resident per approximately 600 square feet or about 75 residents (30 dwelling units) per acre – to fully overcome the loss of parking, as long as one feeder bus is added for each 100 parking spaces removed. For example, replacing 400 parking spaces with 240 residents (about 100 dwelling units) and adding four feeder buses to serve station access would sustain existing station ridership.
- Assuming a 50-50 mix of retail and non-retail employment, each station area employee correlates to the same amount of daily ridership as 2.9 station area residents (roughly one household). It should be noted that a variety of studies have found that employment uses should ideally be within one-quarter mile of a rail station to promote rail ridership. It should also be noted that the database used for the model includes employment centers in downtown Oakland and San Francisco; employment on more suburban corridors with free parking and good freeway access could be expected to generate less ridership.

Economic Benefits from TOD

Ridership and other transportation impacts are just one set of benefits that accrue from transit-oriented development. Another relates to real-estate and fiscal impacts, and a range of research has documented the economic benefits that TOD brings.

The Transportation Research Board report provides a comprehensive synthesis of the evidence to date, and concludes:¹³

The weight of evidence to date shows that development near transit stops enjoys land-value premiums and generally out-performs competitive markets. This generally holds for residential housing (especially condominiums and rental units) as well as office, retail and other commercial facilities.

In the East Bay, for example, TOD apartments attract a 10-15% premium over comparable units in the same municipality. In Santa Clara County, the premium is 28%. The case study presented in Appendix B shows how a TOD policy can also bring dramatic improvements to fiscal health – Arlington County enjoys a AAA bond rating and some of the lowest real-estate tax rates in North Virginia, thanks to its policy of intensive development close to rail stations in the Rosslyn-Ballston corridor.

¹³ Cervero, Robert et. al. (2005), Chapter 9.

However, the TRB report qualifies this conclusion by suggesting that “the payoffs are not automatic,” and that several conditions must be in place, including:

- An upswing in the economy, with plentiful demand for real estate
- Worsening traffic congestion, which provides a clear benefit to having rail service
- Public policies to promote TOD, such as zoning bonuses

In many cases, the economic benefits take time to accrue. In Santa Clara County, no measurable land value premiums were initially found, but were appreciable after ten years of operation. However, market demand is strong at both the Bay Area and national level. The most comprehensive recent study found that at least one-quarter of all new households could be looking for housing in transit zones – particularly in the Bay Area and other regions with mature and extensive transit systems.¹⁴

¹⁴ Center for Transit-Oriented Development (2005), *Hidden in Plain Sight. Capturing the Demand for Housing Near Transit*. April 2005.

Chapter 3. Corridor Thresholds

When MTC adopted the TOD policy in July 2005, four of the seven extension corridors (excluding ferries¹) did not meet the required housing threshold. Updated analysis undertaken as part of this evaluation, coupled with increased development and zoning changes in station areas over the past year, shows that all of the remaining corridors can meet the threshold with a moderate or enhanced level of planning for TOD that local city staff believes is feasible.

Analysis undertaken as part of this evaluation has provided site-level evaluation of station area capacity in the SMART and BART-San Jose corridors. In addition, ABAG has refined corridor estimates for the eBART and Dumbarton Rail corridors. The detailed corridor analysis had three primary functions:

- Establish a baseline understanding of existing housing unit numbers and local plans within the 1/2-mile station areas;
- Establish a methodology for evaluating station area capacity and assess the potential for each corridor to meet MTC's TOD thresholds; and
- Work with the Corridor Working Groups to develop a corridor-level understanding of opportunities and barriers to meeting the TOD thresholds.

The level of planning and implementation effort necessary to meet the thresholds varies between the corridors. Some corridors have a straightforward path to meeting the thresholds – Dumbarton Rail, for example, is expected to meet the thresholds with new development under construction, and once the Redwood City Downtown Precise Plan is adopted (scheduled for late 2006). Other corridors such as SMART have the opportunity to meet the thresholds with longer-term development coupled with focused planning efforts in some station areas.

Figure 3-1 shows the required thresholds for each mode of transportation. Figure 3-2 summarizes the current performance of each corridor against the thresholds.

The first section in this chapter reviews experience from other regions, using the amount of development around rail stations in places such as Arlington County, VA and suburban Chicago to benchmark the MTC thresholds. The second section analyzes each corridor in depth. The final parts of this chapter discuss some common issues, including methodology, land-use conflicts and the potential for employment thresholds.

¹ Ferries are excluded since the ferry "corridors" are the subject of ongoing work to inform policy options.

Figure 3-1 Corridor Housing Unit Thresholds – Average per Station Area

Project Type	BART	Light Rail	Bus Rapid Transit	Commuter Rail	Ferry
Housing Threshold	3,850	3,300	2,750	2,200	750

Source: MTC TOD Policy, adopted July 2005. See Appendix A for the full policy.

Figure 3-2 Resolution 3434 Corridor Performance

Corridor	Threshold (Housing Units)	Achieved with current development?	Achieved with current development plus adopted plans?	Achieved with TOD scenario?
BART East Contra Costa Rail Extension (eBART)	2,200	No	No	Likely with long-term TOD, pending Ridership Development Plans
BART – Downtown Fremont to San Jose/Santa Clara (SVRT)	3,850	No	No	Yes, with moderate TOD
AC Transit Berkeley/Oakland/San Leandro Bus Rapid Transit: Phase 1	2,750	Yes	--	--
Caltrain Downtown Extension/Rebuilt Transbay Terminal	2,200	Yes	--	--
Muni Third Street Light Rail Transit Project Phase 2 – New Central Subway	3,300	Yes	--	--
Sonoma-Marin Rail (SMART)	2,200	No	No	Yes, with long-term TOD
Dumbarton Rail	2,200	No	Likely, provided that Redwood City Downtown Precise Plan is adopted	---
Expanded Ferry Service	750	Varies.* Terminal sites that do not currently meet the threshold have not yet been analyzed in enough detail to determine potential.		

*Depends on ferry terminal sites considered (e.g. in places such as Richmond where there are alternative sites in the Marina and on the Ford Peninsula), and whether they are analyzed as a corridor or not.

Experience from Other Regions

The Phase 1 TOD study examined several case studies of transit-oriented development policy in other regions, such as Portland, OR, and the State of Maryland. In most cases, however, these focused on policy mechanisms rather than the actual amount of residential development located close to transit.

This section provides examples of TOD performance (measured in terms of amount of development within ½ mile of transit) in several other regions. The results are summarized in Figures 3-3 through 3-8. The full case study analysis is provided in Appendix B.

The overall conclusion is that most TODs in other regions more than exceed the MTC housing thresholds. This is particularly true for New Jersey's Hudson-Bergen light rail line, and the Rosslyn-Ballston Corridor in Arlington County, Virginia. The California examples studied for this evaluation have had more difficulty in reaching the thresholds, including those in San Diego, Los Angeles, Sacramento and Santa Clara County. This suggests in itself that California transit investments have often taken place in the absence of land-use planning to ensure long-term, healthy levels of ridership. However, the California TODs as a whole are still within 4% of the thresholds, and this does not take into account future planned development or adopted plans.

Methodological issues mean that these data are not directly comparable to the MTC threshold. However, they still provide a useful benchmark regarding the achievability of the TOD thresholds. These issues are as follows:

- Data are generally from the 2000 census, and do not take account of future development or adopted zoning (as does the MTC policy). They also refer in some cases to occupied housing units or households, rather than the total number of housing units which is the basis for the MTC policy.
- The California and Rosslyn-Ballston examples may not exactly match the half-mile radius from the station (the California data have been adjusted based on total acreage, while the Rosslyn-Ballston data are generally for the ¼ mile radius).
- The examples are often from "best practice" stations or corridors; they may exclude underperforming stations on the same line.

Figure 3-3 TOD Performance in Other Regions

System	Average Housing Units/Station	Equivalent MTC TOD Policy Threshold	% Difference from TOD Policy Threshold
New Jersey – Hudson-Bergen Light Rail	7,063	3,300	+ 114%
New Jersey – Transit Villages	3,558	2,200-3,850*	+ 39%
Chicago – Evanston	4,192	2,200	+ 91%
Arlington County – Rosslyn Ballston Corridor	5,022	3,850	+ 30%
California – Various examples	3,113	2,200-3,850*	-4%

*Varies depending on station

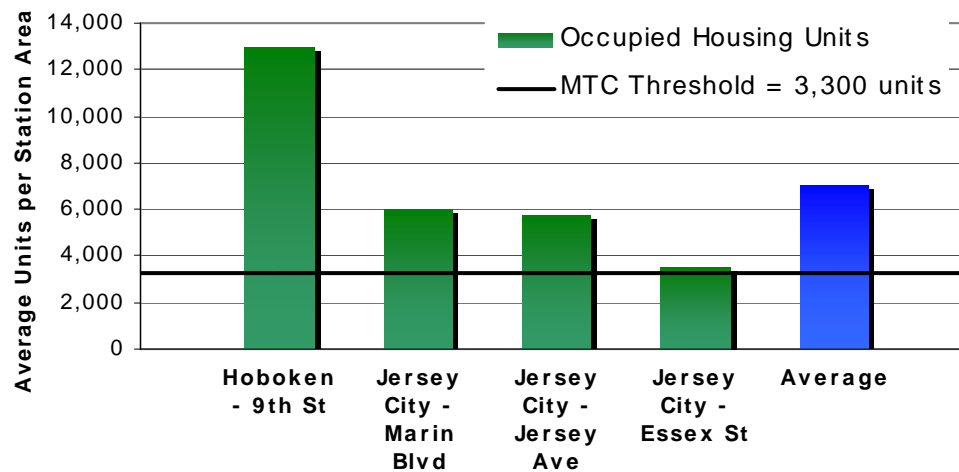
Figure 3-4 TOD Development – Hudson-Bergen Line, NJ

Figure 3-5 TOD Development – New Jersey Transit Villages

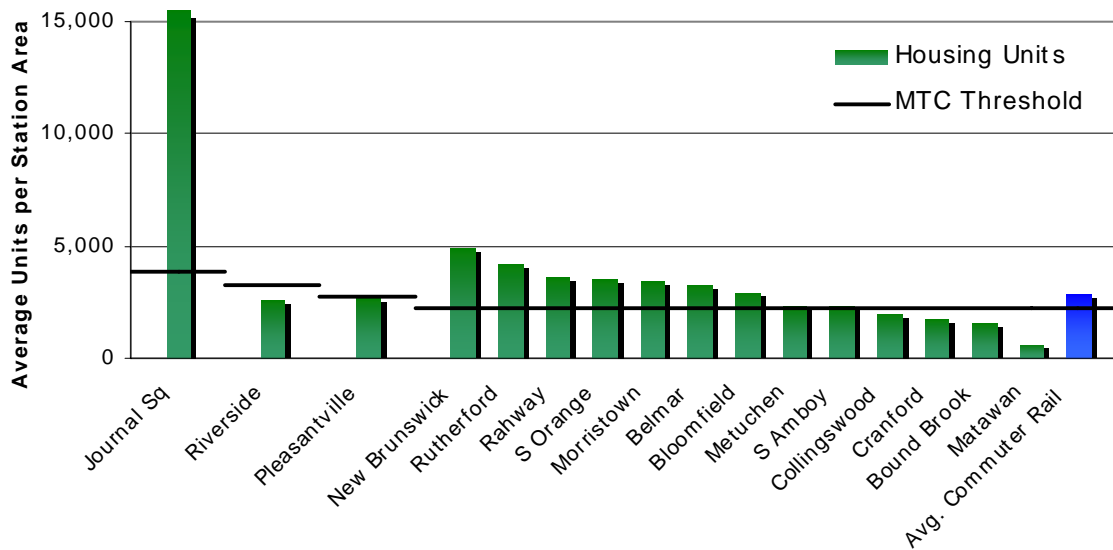


Figure 3-6 TOD Development – Evanston, IL

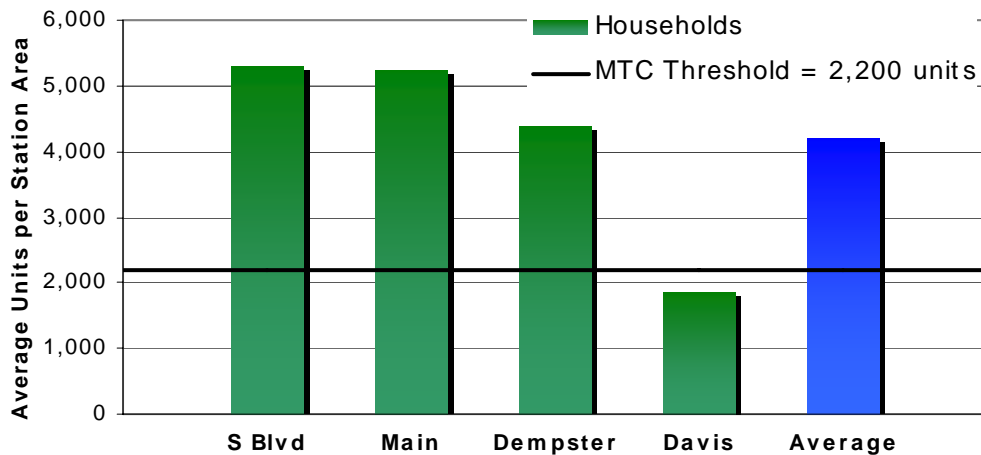
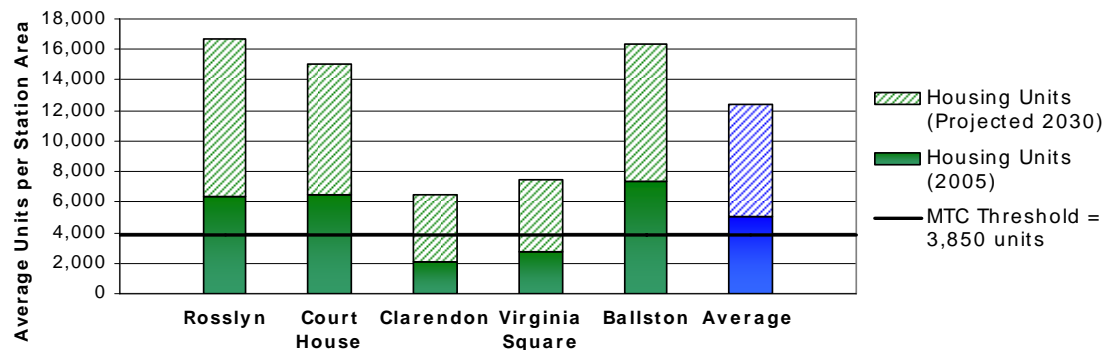
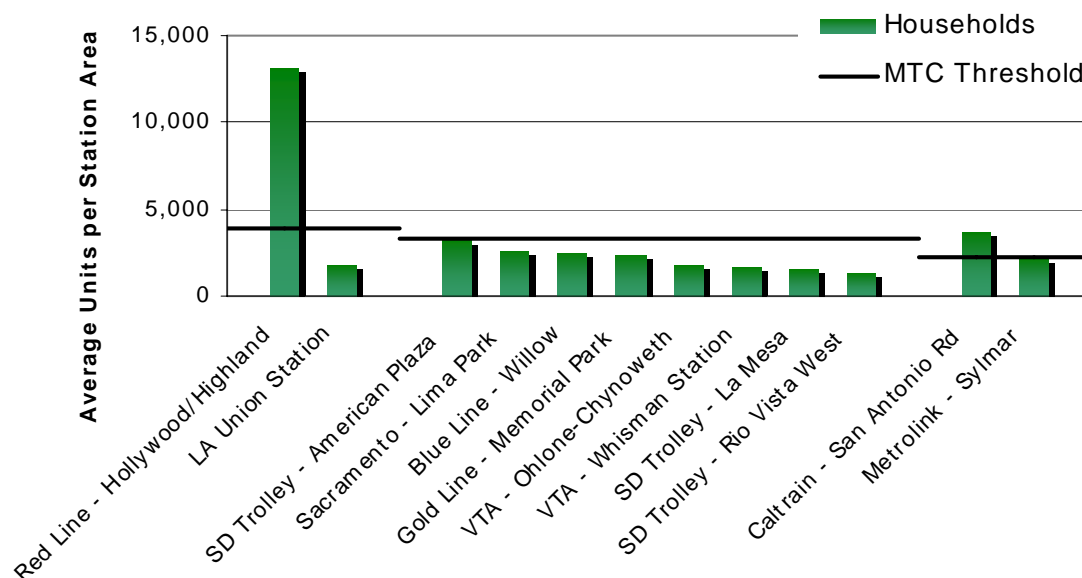


Figure 3-7 TOD Development – Rosslyn-Ballston Corridor, VA**Figure 3-8 TOD Development – California Examples**

Bay Area Corridor Performance

SVRT and SMART Corridors

As part of this evaluation of MTC's Resolution 3434 TOD policy, two focused studies were initiated in the Silicon Valley Rapid Transit (SVRT) and Sonoma Marin Area Rail Transit (SMART) corridors. These studies combined census data with in-depth discussions with planning staff from each jurisdiction which refined the understanding of existing conditions as well as potential opportunity sites. Various scenarios for future development projections were then analyzed to progressively expand the opportunity site footprint and refine the approach to TOD. The sites considered in each scenario are shown in Figure 3-9. In contrast

to the ABAG 2030 projections (discussed below), these scenarios include the 50% bonus granted for new below-market rate units.

Note that in some cases there is a “low” and “high” value – this is a function of the range of densities permissible under the existing or potential zoning. MTC's policy as written allows only minimum densities to be counted towards the TOD policy threshold, meaning that the “low” value would typically be used.

Figure 3-9 Sites Considered in TOD Scenarios

Scenario 1: Existing Zoning	Scenario 2: Short-Term Anticipated TOD	Scenario 3: Long-Term Enhanced TOD
Existing development Development pipeline Vacant parcels Surface parking lots	Existing development Development pipeline Vacant parcels Surface parking lots Anticipated development sites Underutilized sites	Existing development Development pipeline Vacant parcels Surface parking lots Anticipated development sites Underutilized sites Longer-term opportunity sites

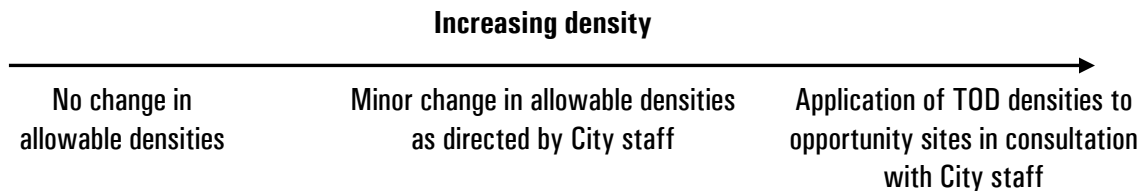


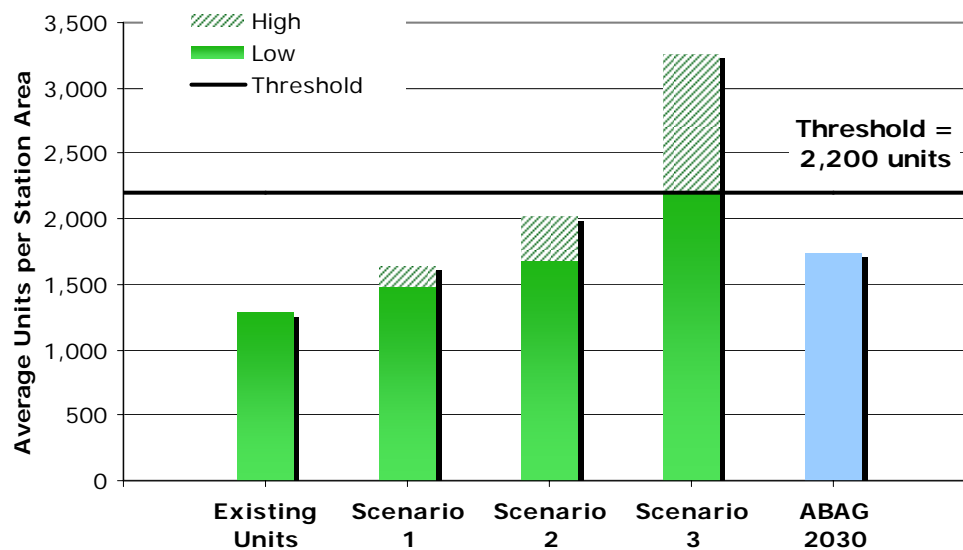
Figure 3-10 shows the summary analysis for SMART. It indicates that the threshold is achievable in the long-term (Scenario 3) with a continued focus on transit-oriented development and continued station area planning efforts. The figure also shows ABAG projections for comparison purposes, which are discussed later in this chapter.

The analysis of the SMART corridor also identified several buildout scenarios at the corridor level. These scenarios are intended to highlight how the corridor thresholds can be met with different stations developing at different buildout levels. The scenarios accurately reflect the constraints on each station area and attempt to make realistic projection of station capacity. For this reason, the scenarios tend to assume the downtown stations in San Rafael, Santa Rosa, and Petaluma, as well as the second stations in Santa Rosa and Petaluma, will have the highest buildout levels. In contrast, the scenarios identify more limited TOD potential at stations such as Larkspur Ferry, the two Novato stations, and Rohnert Park. A number of stations in Sonoma County jurisdictions, including Windsor, Healdsburg, Cloverdale, and Cotati either have a large number of existing units or have the potential for TOD with additional planning.

Figure 3-11 shows the analysis for the SVRT corridor. The housing threshold is met under Scenario 2, which reflects the significant land use changes that many jurisdictions in the

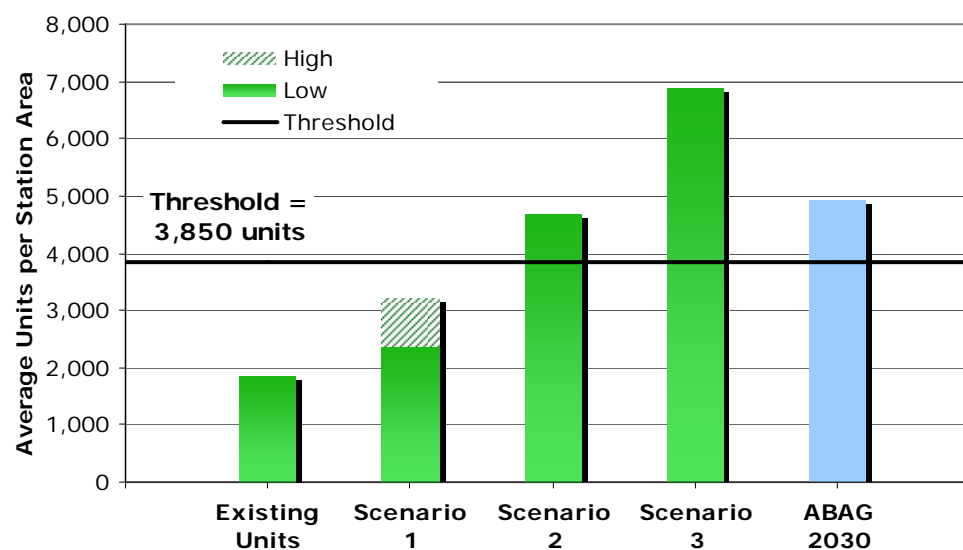
South Bay are already conceptualizing or planning for as a result of the planned BART extension. The Montague/Capitol, Berryessa and Downtown San Jose stations would absorb the largest share of the new housing in the SVRT corridor. No new residential development is assumed for Warm Springs.

Figure 3-10 Potential Station Area Housing – SMART



Source: Community Design + Architecture

Figure 3-11 Potential Station Area Housing – SVRT



Source: Arup

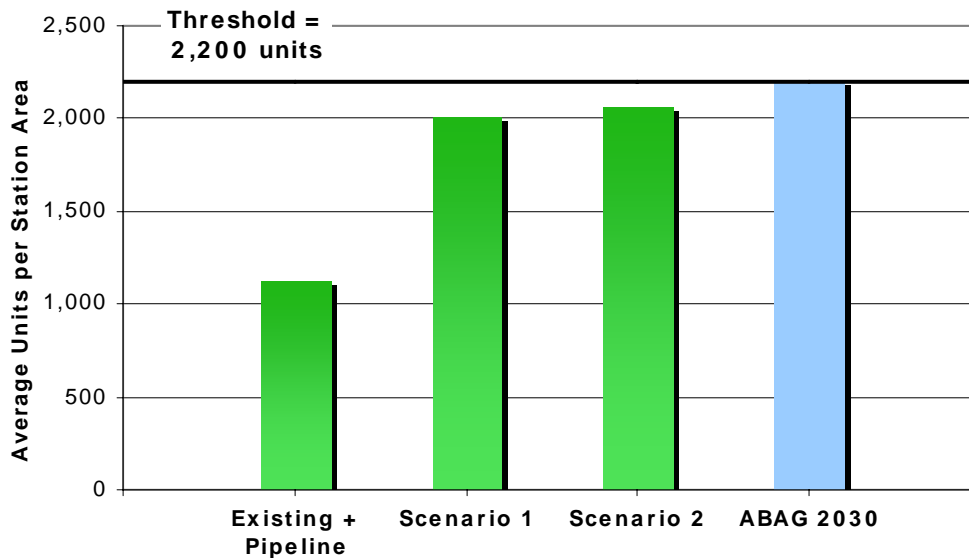
eBART Corridor

The eBART corridor has been the subject of separate analysis for BART. Figure 3-12 shows the number of existing and potential units, together with an estimate of buildout under current General Plans (Scenario 1).² Scenario 2 is similar but not directly comparable to Scenario 2 for the SMART and SVRT corridors; it reflects some preliminary estimates of the potential for increased development within ½ mile of station sites.³ Note that, in contrast to the results for SMART and SVRT, it does not include any affordable housing bonus which would increase the number of “units” further.

Scenario 3 has not been developed for the eBART corridor. However, the results of the other scenarios, together with ABAG's projections for 2030, indicate that the TOD policy threshold is likely to be achievable with additional planning and a continued focus on transit-oriented development. Additional TOD scenarios and station area plans are being developed as part of BART's Ridership Development Plan process. These planning studies will examine whether local jurisdictions can attain and move beyond the Scenario 2 development.

As on other corridors, there is a wide variation between different stations on the corridor. Pittsburg/Bay Point would account for roughly one-third of the total on the eBART corridor, with Hillcrest and Empire/Neroly accounting for fewer than 900 units each.

Figure 3-12 Potential Station Area Housing – eBART



Source: MIG

² The extrapolation of individual jurisdictions' plans was based on typical/midpoint intensities/densities and reviewed by jurisdiction staff. Note that compliance with MTC's TOD policy would be determined through minimum densities, which would be lower than those shown in these charts.

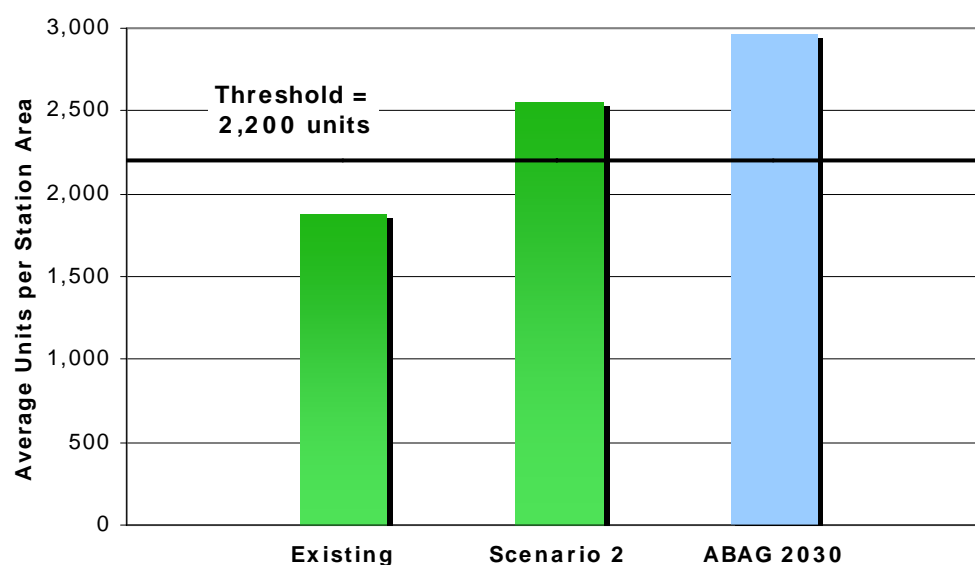
³ This is referred to as Alternative 1 in the eBART planning work – for consistency with other corridors, it has been relabeled as “Scenario 2.”

Dumbarton Rail Corridor

When MTC adopted the Resolution 3434 TOD Policy in 2005, the Dumbarton Corridor did not yet meet the threshold of 2,200 housing units per station area. Since then, a great deal of new construction has taken place in the corridor, particularly in Redwood City and Union City. While the corridor does not yet meet the threshold, this is likely to be comfortably achieved with planning efforts currently underway, provided that these plans and zoning are adopted. For example, the Redwood City Downtown Precise Plan is currently undergoing environmental review, and is scheduled for adoption by the end of 2006.

Figure 3-13 shows the number of housing units against the MTC TOD policy threshold, including the affordable housing bonus. Scenario 2 for Dumbarton Rail is not directly comparable to Scenario 2 for the SMART and SVRT corridors, as it does not reflect the same level of detailed analysis. Rather, it refers to the estimated number of units that local planners believe will be added within the ½-mile radius of their station areas. These are not necessarily the minimum, midpoint, or maximum allowable density, but do tend to reflect conservative assumptions.

Figure 3-13 Potential Station Area Housing – Dumbarton Rail



Source: ABAG

Ferry Corridors

By their nature, ferry “corridors” are more flexible than rail- or bus-based corridors, as different, individual terminal sites can be treated as one or many “corridors”. MTC’s Resolution 3434 TOD policy referred to two ferry corridors based on the Water Transit Authority (WTA) planned phasing of ferry service (Figure 3-14). Since then, however, WTA phasing plans have changed based on further planning and financial analysis, affecting the Resolution 3434 classification. In response, MTC staff and the consultant team are currently

developing options for how the TOD policy can appropriately be applied to ferries, and how ferry “corridors” should be defined.

Figure 3-14 Ferry Corridors in TOD Policy

Original Resolution 3434 Classification		Current Classification
Corridor 1 (Phase 1)	Corridor 2 (Phase 2)	Single Corridor
Berkeley	Hercules	Berkeley
Alameda/Oakland/Harbor Bay	Richmond	Alameda
South San Francisco	Antioch	Hercules
	Treasure Island	Richmond
	Redwood City	East Bay to South San Francisco
	Alameda to South San Francisco	

Note: All routes are to San Francisco unless stated.

ABAG Projections

ABAG projections provide an alternative way of examining the potential for each corridor to meet the TOD policy threshold. It should be stressed that corridors do not “qualify” simply by exceeding the TOD threshold according to ABAG projections – rather, this can only be done on the basis of adopted plans and zoning. However, the projections do provide one projection of the amount of development that might be expected in each corridor.

The figures are based on ABAG's *Projections 2005*, which is the most current iteration of the standard regional forecast used for all planning purposes. The Projections are produced at the county, city, and census tract levels. Since most station areas include portions of multiple census tracts, a methodology was developed to estimate the number of units in each census tract that will fall within the 1/2-mile radius from existing or planned stations.

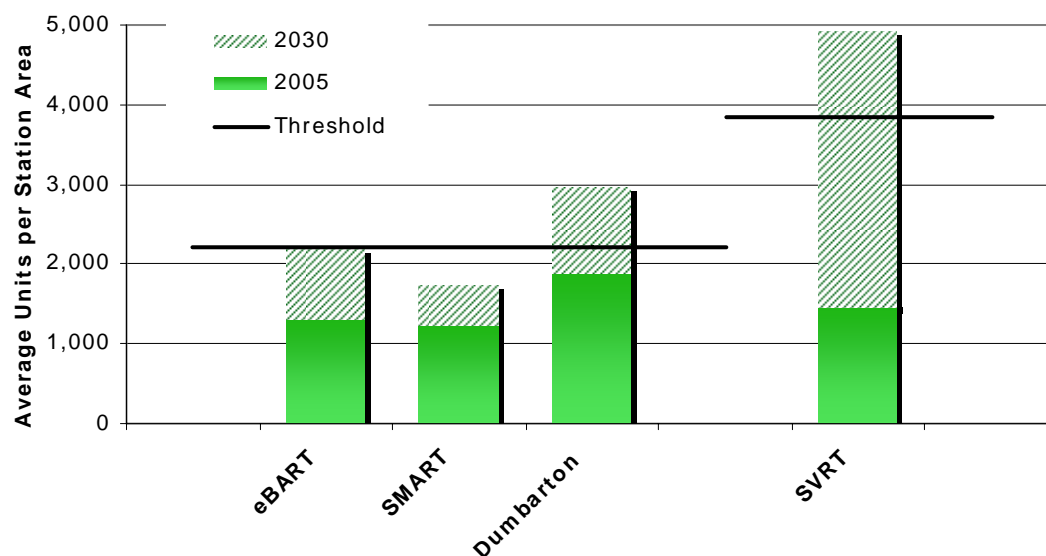
Note that Projections 2005 represent a shift from being more trend-based to more policy-based. They assume that over time an increasingly higher percentage of new development in the region will take place within TODs and closer to transportation corridors. Accordingly, in developing most station area estimates a factor was used to apportion a higher number of projected new housing units to the station areas relative to the projected growth in the overall census tracts. For 2005, 15% of the projected growth between 2000 and 2005 in applicable census tracts was shifted from the area outside of the ½-mile radius to within the station area. The 2030 figures similarly assume that in each subsequent 5-year period, an additional 15% of projected growth in the census tracts will occur within rather than outside of the station areas. This methodology is an attempt to recognize that over time, more of the projected growth in a census tract is likely to occur within the ½-mile radius of the station. The methodology and numbers were reviewed with the corridor consultants or station area representatives.

Figure 3-15 shows the results of the projections. In summary, the conclusions are as follows:

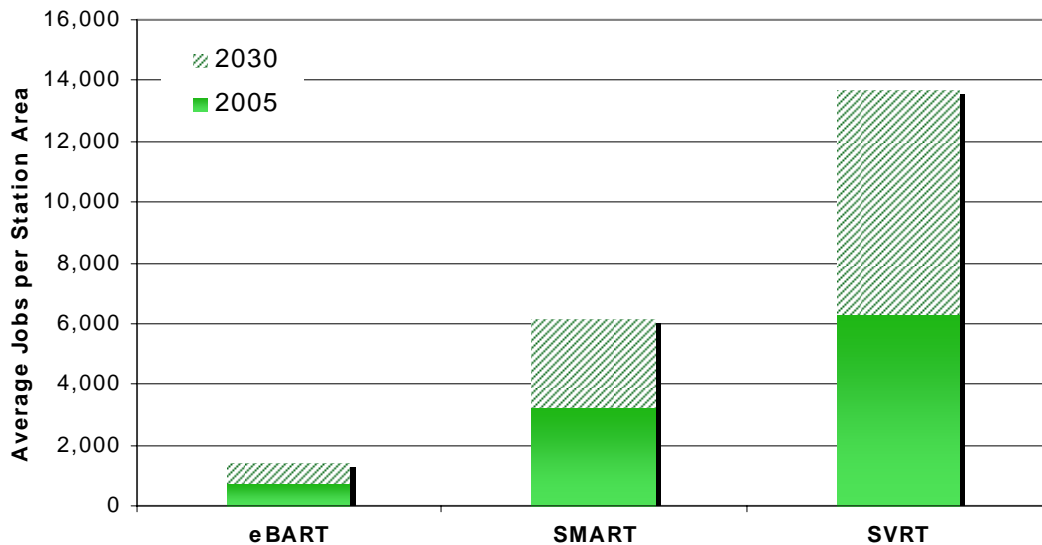
- The Dumbarton and SVRT corridors would comfortably meet the threshold in 2030, showing that this is reasonably attainable. Indeed, the Dumbarton corridor is likely to meet the threshold once plans are adopted in Redwood City and Union City.
- The eBART corridor would meet the threshold when the affordable housing bonus is factored in (it is five units short of the 2,200 required based on the raw number of units), based on ABAG projections for 2030. Again, this does not indicate that the corridor currently meets the TOD policy threshold, but rather that it would need to codify this potential through adopted station area plans and zoning.
- The SMART corridor does not meet the thresholds based on current ABAG projections. However, the corridor does have the potential to meet the thresholds through long-term implementation of local plans and additional TOD planning in some locations, as discussed in the previous section.

ABAG also analyzed current and projected future station area employment levels for selected corridors. While the MTC TOD policy does not include an employment threshold, these results are shown in Figure 3-16 for completeness. Jobs are most significant on the SVRT corridor.

Figure 3-15 ABAG Projections 2030 for Station Area Housing



Source: ABAG

Figure 3-16 ABAG Projections 2030 for Station Area Employment

Source: ABAG

Methodological Issues

MTC's TOD policy is not specific about the method that should be used to count station area housing units, apart from the use of the minimum densities allowed by zoning rather than the mid-point of a range. However, the analysis discussed above suggests that methodology may be an important issue when determining compliance with the housing thresholds. Specifically:

- **Definition of opportunity sites.** The analysis is highly dependent on assumptions regarding which future parcels in a station area will be developed. For example, many corridors may comfortably meet the housing threshold with minimal changes to current zoning were the entire station area to be redeveloped, but in reality only a small number of parcels will turn over – particularly in single-family home neighborhoods. Other parcels will remain underutilized compared to the minimum density required by zoning, depending on the local market. The number of opportunity sites will depend on community character, amount and intensity of existing development, physical constraints, and other factors. For example, the SVRT corridor station areas each have different constraints to TOD to consider, from historic districts to airport noise to well-established residential neighborhoods. On the other hand, downtown areas may not have much remaining vacant land, but may support significant redevelopment in the future.
- **Different methodologies for counting existing units.** In several corridors, most notably the SMART corridor in Sonoma and Marin counties, there are slightly different counts of existing housing units provided by different data sources. The

team is now taking into consideration a methodology which would provide a blend of data sources in order to improve the accuracy by which existing units are counted.

- **Mixed-use zoning.** MTC's policy specifies that minimum densities will be used when calculating thresholds. This may unintentionally penalize some mixed-use zoning, where housing is permitted but not required. On the other hand, it may encourage local jurisdictions to require minimum levels of housing as part of mixed-use zoning. Arlington County's policy (discussed in Appendix B) is an interesting parallel – it requires developers to build residential space first before the maximum allowable office density is permitted.
- **Affordable Housing Credit.** MTC's policy states that new below-market housing units will receive a 50% bonus toward meeting the corridor threshold. However, to receive this bonus, rental units must be affordable at 60% of area median income, and ownership units must be affordable at 100% of area median income. Most inclusionary housing policies have higher income thresholds, and/or permit the requirement to be met by payment of in-lieu fees (which could then go to projects outside of the station area), and so there is an issue regarding how these should be counted.
- **Certification process and monitoring are undefined.** There is no process identified in the TOD Policy for monitoring progress of the corridors towards the thresholds or for certifying that the thresholds have been met. For the purposes of analysis for this evaluation, the consultant team has used professional judgment to resolve these issues. However, in the absence of firm guidance on how to analyze station area housing, measurement issues may generate disagreements between project sponsors and MTC and ABAG in the future – particularly if a corridor is on the borderline of the housing threshold.

Affordable Housing

An important aim of MTC's TOD policy was to catalyze not only the development of housing in general in station areas, but the development of affordable housing in particular. To this end, MTC's policy states that new below-market housing units will receive a 50% bonus toward meeting the corridor threshold, subject to the income thresholds described above.

It is too soon to tell, however, whether this incentive is having an impact on local land-use and affordable housing policies. At present, most local jurisdictions appear to be relying on their existing inclusionary housing policies to receive the bonus. In any case, any impact would be likely to be seen in any corridor that is on the border of complying with the TOD policy threshold.

Land Use Conflicts

The analysis for the SMART and SVRT corridors has revealed numerous land-use conflicts at individual stations. At certain stations, particularly Warm Springs as shown in Figure 3-17, there is little potential for any development. At others such as Novato North and Larkspur,

constraints such as freeways and the San Francisco Bay preclude a significant amount of TOD, and station area housing will be below the threshold. Some of these issues have been encountered in MTC-funded Station Area Plans; at Fairfield, for example, approximately one-third of the planning area has been identified as significant habitat for special-status species.

The analysis, however, has also revealed the strength of the corridor concept in determining compliance with the MTC TOD policy. None of these land-use conflicts mean that the corridor is unable to meet the housing unit threshold, as underperforming stations can be countered by other stations along the line which provide more than the minimum amount of housing. Indeed, land-use conflicts were factored in when setting the housing minimums per corridor. For example, Figure 3-18 shows how the SVRT corridor can meet the housing threshold even with no new housing at Warm Springs.

The TOD policy can also be used as a tool to influence station siting, encouraging stations to be located where they maximize the opportunity for new development. For example at the proposed Richmond ferry terminal, one potential location (in the Marina) will have little difficulty in meeting the 750-unit threshold, while this will be more challenging for the location at the end of the Ford Peninsula. Most of the corridors have yet to revisit station siting decisions, but preliminary indications are that the TOD policy will be valuable in providing an incentive to avoid locations with major land-use conflicts.

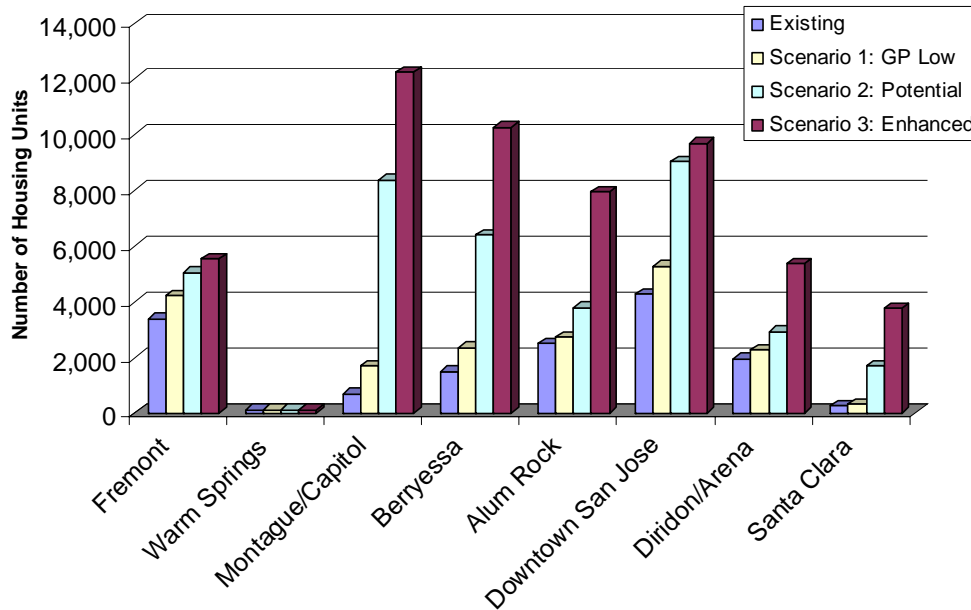
A related issue is industrial land preservation, which has been addressed by the MTC-ABAG Joint Policy Committee (JPC). In May 2006, the JPC expressed concern that much of the housing production to meet the TOD policy threshold might be achieved through conversion of industrial land, and asked MTC to consider the extent to which this was taking place. To date, however, it appears that all planned conversions are a result of wider community-based planning efforts or are market driven, and in no instances are attributable to the MTC housing unit threshold. In many instances, such as at Rohnert Park, Montague/Capitol and Berryessa, industrial uses are planned to remain in place in at least part of the station area. Figure 3-19 shows the stations in the SMART and SVRT corridors where there are significant areas of industrial, goods movement or similar use.

Figure 3-17 Warm Springs – Current Land Use Designations



Revision Date April 26, 2008

Source: Arup

Figure 3-18 Corridor Housing Comparison – SVRT

Source: Arup

Figure 3-19 Industrial Uses in SMART and SVRT Station Areas

Station	Current and Planned Use
SMART	
Cloverdale	There is an industrial site east of the station. The City recognizes the site as a long-term incompatible use (wood is shipped in from the south and shipped out to the south again).
Healdsburg	Some lumber yards and other industrial uses south of the station site. The City has long term plans to do a Specific Plan to create a new mixed-use town center in this quadrant of the station area. Healdsburg also allows some worker housing on industrial sites.
Jennings Avenue	South and east of the station are some industrial uses. The City of Santa Rosa is interested in preserving some areas, but not necessarily all.
Rohnert Park	Light industrial area south and east of the station. There are no plans for changes to this area.
Corona Road	One alternative station site is an industrial site (mostly trucking) and there are some business park and light industrial uses north and west of the station. None of the housing that is already being built in the station area is in this quadrant.
SVRT	
Warm Springs	The potential conflict with the NUMMI plant has been avoided by planning for only non-residential uses in the station area; no net new residential units are envisioned. As there is also a significant amount of vacant land in the area, very few industrial uses are expected to be displaced.

Station	Current and Planned Use
Montague/Capitol	<p>The City of Milpitas, through an intensive community planning effort, recently adopted the final Transit Area Concept Plan, which paves the way for a specific plan and environmental clearance effort. The Concept Plan calls for substantial conversion of the industrial land in the area to convert to residential and office/retail uses. Current industrial uses consist of light manufacturing and assembly; warehousing; and distribution. It is possible that there will be conflicts between new residential developments and existing industrial land uses as development is phased in over time.</p> <p>Land north of Lundy nearest to the San Jose city border would remain industrial. This would retain compatibility with the current industrial uses in the area south of Lundy in the city of San Jose. There are no plans in San Jose to convert that industrial area to other uses.</p>
Berryessa	<p>Industrial uses are located west of the Flea Market past Coyote Creek. Residential uses are located north, east, and south of the Flea Market and future station site. The industrial area is one of the few remaining concentrations of heavy industrial uses in the South Bay, including a cement plant. City of San Jose planning staff studied industrial land conversion trends in the city, and recommend that this area be maintained, using Coyote Creek as a natural buffer; this area will likely not be influenced by residential development at the station. The current Flea Market will be redeveloped into residential and commercial uses; the current development plan uses Coyote Creek, parkland, and commercial uses to help buffer the site from the industrial area. There is another, less-intense, industrial area located south of the Flea Market and east of Coyote Creek, which is already surrounded by single-family residential development and could be converted from warehousing/distribution facilities to transit-oriented development. To the north, adjacent to the Flea Market and residential neighborhoods, San Jose planning staff are recommending conversion from light industrial to high density residential uses.</p>
Alum Rock	<p>Apart from the future BART station site, there is little industrial land left in this predominantly commercial and residential community. The existing industrial uses consist of small- to medium-scale automotive repair and light manufacturing businesses along 28th Street. The BART station site currently has some truck rental facilities and a material storage yard. The community's Strong Neighborhood Initiative plan calls for conversion of industrial land to commercial, residential, and park uses.</p>
Diridon / Arena	<p>The Midtown Specific Plan calls for adaptive reuse of warehouse and manufacturing buildings to commercial uses and residential lofts to the south and east of the station. The policies supporting the conversion of industrial uses in this area precede the adoption of the MTC TOD Policy. Further to the north and west, mixed residential and light industrial areas have been designated mixed-use districts, while some industrial areas are in the process of converting to residential uses as a result of market pressures.</p>
Santa Clara	<p>Although there is industrial land in the vicinity of the station, it does not appear to be cause for conflict with new residential uses. City of Santa Clara staff indicated that land used for heavy industrial purposes to the northwest of the station site would probably not change to residential use, and there is no policy shift supporting that change envisioned in the near future. The former FMC defense contractor site is now owned by the City of San Jose and will be redeveloped to commercial and office uses. Some other industrial uses south of the FMC site are being converted to residential uses.</p>

Note: Only stations with significant industrial uses are included.

Employment Thresholds

The potential for employment thresholds, to be levied as well as housing thresholds or as a means to gain credit towards meeting the housing threshold, was a subject of considerable debate by the Commission during the TOD policy adoption in 2005. This interim evaluation provides no evidence to support changing the decision on employment thresholds. There are several reasons for this:

- Employment works best in generating transit ridership if job centers are concentrated at particular hubs, rather than spread throughout the corridor. Good examples are the large Central Business Districts served by rail lines, for example in downtown Berkeley and Oakland. On the Resolution 3434 corridors, the downtown San Rafael SMART station and the downtown San Jose BART station are critical employment destinations. This suggests an increased focus on employment in specific station area plans, rather than a corridor-level threshold which may perversely encourage dispersal of employment sites.
- The overall demand for office space varies considerably by corridor. A “one-size-fits-all” threshold may not be appropriate; the thresholds would need to be related to market demand. More importantly, the level of market demand will also depend on other planning efforts away from the corridors. Incentives for higher density employment centers within station areas may be less important than citywide or subregional disincentives for lower density employment centers in campus settings off transit corridors that will compete for the jobs around transit hubs.
- In outlying locations, residential achievable densities are generally much higher than achievable densities for employment. Transit ridership follows density, so suburban job centers rarely generate significant transit ridership. This can be seen in the results from the surveys at Pleasant Hill discussed in the previous chapter.
- Cross-commuting means that suburban employment centers, particularly if dispersed along a corridor, may have limited potential to attract transit ridership from a wide residential commute shed. This is particularly true in the absence of parking pricing or other strong Transportation Demand Management programs. This does mean, however, that it is important to develop employment clusters around specific stations, particularly in both urban and suburban downtowns.
- Local jurisdictions already have many reasons to zone for employment and are doing so, such as sales tax revenue and reduced fiscal impacts. MTC's TOD policy provides counterbalancing incentives to promote housing, in recognition of the Bay Area's housing shortage.
- Housing units are much simpler to define and measure than employment uses, which require significant assumptions regarding the type of future tenant and employee density (i.e., the number of employees that will occupy a building of a given size).

Chapter 4. Corridor Working Groups

Along with housing unit thresholds and station area plans, Corridor Working Groups are one of the three pillars of MTC's TOD policy. They are intended to be coordinated by the county Congestion Management Agencies (CMAs) and include the sponsoring transit agency, the local jurisdictions in the corridor, and representatives from ABAG, MTC, and other parties as appropriate. They have several core functions:

- Assessing whether the planned level of development satisfies the corridor threshold, prior to certification by MTC
- Assisting in addressing any deficit in meeting the threshold by working to identify opportunities and strategies at the local level
- Distributing the required housing units to each of the affected station sites

Overall, it is still too soon to fully evaluate the success of the Corridor Working Groups. Corridor planning has not yet reached the stage where potentially difficult decisions regarding allocation of housing units to individual stations need to be taken, and most planning so far has been undertaken directly with individual jurisdictions. However, different corridors so far have had different experiences which provide valuable lessons:

- **eBART** – this corridor is in some respects the furthest advanced, and city staff has been truly integrated into the planning process. The Corridor Working Group consists of local jurisdiction staff, Tri Delta Transit, the Contra Costa County Transportation Authority and MTC staff when available. The group meets monthly to stay engaged in the eBART project and to discuss coordination issues related to station area planning. BART engaged this committee to work collaboratively with BART throughout the project development process, focusing on both station area planning and the larger eBART project.
- **SVRT** – the Corridor Working Group has met twice to date to provide input on the corridor analysis scope of work, and to review the preliminary results of the threshold analysis. The consultant team has also met individually with members to obtain detailed information for the analysis.
- **SMART** – this Corridor Working Group has largely consisted of the transit agency (SMART) and the CMAs from Marin and Sonoma counties. This is largely due to the current stage of planning and approvals; local jurisdictions may be able to become involved more directly should the November 2006 ballot measure for a ¼-cent sales tax to fund the project be approved, and once the Environmental Impact Report is certified.
- **Dumbarton Rail** – the Corridor Working Group ceased to meet once it became clear that the corridor would comfortably meet the housing thresholds.

The preliminary conclusions from this evaluation suggest that Corridor Working Groups have the potential to be highly valuable. The original rationale for the groups – to help develop consensus on the allocation of new housing units between different stations along the corridor – remains undiminished. Corridor Working Groups also provide the opportunity for local jurisdictions to identify how a station fits in within the broader context – for example, through determining which stations are employment or retail centers, which are park-and-ride nodes and which are housing intensive with a focus on access by bicycle and on foot. However, there is little incentive for Corridor Working Groups to continue to meet once there is a clear path to ensuring that the housing thresholds are met.

There are several additional functions that the Corridor Working Groups may be able to assume going forward:

- **A role in determining potential SuperHIP and other funding allocations.** One of the recommendations of this evaluation is to develop incentives for corridors to exceed the housing threshold, for example through a “SuperHIP” program to reward additional housing units (see Chapter 6). The Corridor Working Group may be a suitable forum for determining the baseline number of units for each city above which the incentives are payable, within MTC guidelines, and for prioritizing station access improvements to receive this funding.
- **Determining how to maximize ridership** and meet other criteria. For many of the corridors, meeting the MTC TOD policy threshold is necessary but not sufficient to proceed. Other hurdles vary by corridor, but may include meeting farebox recovery, federal New Starts or BART System Expansion criteria; or ensuring that local funding sources are approved.
- **A role in planning access improvements** to the stations through an MTC-funded Corridor Strategic Plan. This relates to maximizing ridership. The Corridor Strategic Plan could be funded by MTC and address the following issues:
 - Prioritizing access improvements identified in station area plans, and recommending allocation of potential SuperHIP or other incentive funding.
 - Identifying station types – in particular, key nodes for employment uses, and stations where park-and-ride facilities may be concentrated. Many local jurisdictions may desire to be the subregional employment or retail center; the Corridor Strategic Plan provides the basis to identify the one or two stations where it makes sense to concentrate these uses.
 - Determining the optimum tradeoff between park-and-ride provision, other access improvements and new development at each station. The Direct Ridership tool (discussed in Chapter 2) provides one way to illustrate these tradeoffs. On the BART A-Line between Lake Merritt and Fremont, for example, an earlier direct ridership analysis identified how enhanced TOD would produce a 20% increase in daily ridership, and showed the point at which TOD would generate enough ridership to fully offset reduced park-and-ride provision.

eBART provides a good example of how a corridor-wide group can address wider issues of ridership development. However, the precise role for the Corridor Working Group should be allowed to vary between different corridors, not least because each corridor faces different challenges in gaining final approval, and some may already have existing organizational structures that duplicate some of these functions.

Chapter 5. Station Area Plans

One of the most important parts of MTC's TOD policy is the requirement for station area plans along proposed Resolution 3434 transit extensions. These station area plans partly function as a mechanism to demonstrate that the housing thresholds are met. However, they also serve a much wider function in addressing the range of other transit-supportive features that are necessary to support ridership, but that are inherently difficult to quantify or set common thresholds for. These include supporting a mix of uses, parking provision, urban design, pedestrian access and market analysis.

In this way, the Station Area Plans are a means to strike a delicate balance. They uphold the regional interest in planning to maximize transit ridership and efficient use of resources. At the same time, they ensure that specific decisions are taken by local communities, without the need for regionally imposed standards.

In some cases, station areas already have suitable plans in place. In other cases, MTC agreed to assist in funding new plans that are needed. Local jurisdictions would be unlikely to be able to fund the plans on their own, and the grants demonstrate that MTC is not promoting unfunded mandates, while ensuring that the planning work is completed. The plans are required to include the following elements:¹

- Land use and density within the half-mile radius of the station, with a clear identification of the number of existing and planned housing units and jobs;
- Station access and circulation, including strategies to overcome barriers to pedestrian and bicycle access
- Strategies to ensure accessibility for people with disabilities, and overcome barriers to wheelchair access
- Estimates of the number of transit riders walking from the half-mile station area
- Design policies and standards
- Parking demand and parking requirements
- Implementation plan, including market demand and phasing

Pilot Grant Cycle

MTC awarded station area planning grants to eight local jurisdictions and transit operators as part of the pilot cycle, in order to enable the success of the program to be evaluated. Figure 5-1 shows the grants awarded and summarizes the current status.

¹ See the TOD policy in Appendix A for a full description.

None of the plans has been completed so far, or even reached the stage where lessons can be drawn from the station area planning program as a whole. However, several grant recipients have noted the influence of MTC's TOD policy on their planning efforts:

MTC's TOD policy has been helpful in continuing to refocus our objectives on maximizing the pedestrian experience and optimizing ridership potential and opportunities. [San Leandro]

The housing target established by MTC's TOD policy has been central in considering the issue of intensification. We recognize that there is an opportunity for the City to accommodate a greater share of new housing units along the SMART corridor, but must balance that opportunity against strong community sentiment for preserving the character and qualities of the historic areas within the project study area. We are now turning our focus on developing a preferred land use plan that will look to maximize housing opportunities within the parameters articulated through the community visioning process. [Santa Rosa]

MTC's Resolution 3434 Policy seeks an average of 2,200 housing units within one-half mile of commuter rail stations. Fairfield has used this figure as a "floor" for its plan. The concept plan prepared to date anticipates approximately 2,700 units within one-half mile of the station. [Fairfield]

Figure 5-1 Station Area Planning Grants – Pilot Cycle

Project Sponsor	Corridor and Station	Grant Amount	Target Completion Date	Activities Completed	Community Outreach Completed
BART	tBART – Hacienda	\$115,000	Mar '07	Draft land-use scenarios Mixed-use retail – market analysis	Six update memos to core stakeholders City Council/Planning Commission workshop Website (tod.hacienda.org)
City of Alameda	Ferries – Alameda Point	\$221,000	Sep '07	Consultant contract not yet awarded. Project start delayed by negotiations with Navy over property transfer.	None
City of Fairfield	Capitol Corridor – Fairfield	\$250,000	Mar '07	Market demand assessment Conceptual land-use plan and development framework Parking, station access and urban design – drafts planned for July 2006	Meeting for property owners, followed by one-on-one meetings Two community workshops Bus tour of Bay Area transit- and pedestrian-oriented neighborhoods for Planning Commissioners and the public Two Planning Commission study sessions Monthly meeting with staff from transit agency, CMA and adjacent city (Vacaville)
City of Menlo Park	Dumbarton Rail – Menlo Park	\$225,000		Delayed pending Council approval of funding, which has now occurred.	
City of Pittsburg	eBART – Railroad Ave	\$308,560		Progress report not yet provided by grant recipient.	
City of San Leandro	Bus Rapid Transit – San Leandro	\$450,000	Apr '07	Market demand assessment Existing conditions – parking, transportation, urban design	Community meetings – June 3 and July 11 Field trip to Bay Area TODs City Council meetings – two to date Website (www.ci.san-leandro.ca.us/slcommdevTODview.html) Citizen Advisory Committee Monthly Technical Advisory Committee meetings (AC Transit, MTC, BART, CMA, Caltrans and ABAG)

Project Sponsor	Corridor and Station	Grant Amount	Target Completion Date	Activities Completed	Community Outreach Completed
City of Santa Clara/ City of San Jose	SVRT – Santa Clara	\$600,000	Oct '07	Existing Conditions and Development Prospects Report – scheduled for June '06	Policy Advisory Group (VTA, two cities and consultant) Technical Advisory Group (partner staff) First public meeting scheduled for summer '06 Stakeholder interviews
City of Santa Rosa	SMART – Downtown Santa Rosa	\$450,000	Dec '06	Market absorption study Existing conditions and opportunities Three conceptual land-use alternatives	Community meetings – March 15, April 5, May 17, June 21 Website (www.stationareaplan.net) 3 Technical Advisory Committee meetings (public agencies and community members)

Barriers Encountered

In March 2006, MTC hosted a workshop with all station area planning grant recipients, along with other stakeholders and partners such as ABAG, the Urban Land Institute, the San Francisco and East Bay Community Foundations, and environmental and social justice groups. This was an opportunity partly to exchange ideas between station plan opportunities, and partly to identify common barriers to TOD and priorities for regional assistance.

Figure 5-2 shows the “long list” of barriers identified. These fall broadly into three categories:

- **Creating Community Vision.** Cities face the challenge of developing broad consensus on a TOD vision among neighbors and elected officials – particularly when transit service is far in the future. Specific issues include the need to provide community benefits as part of a station area plan; preserve historic resources; and address concerns over gentrification of low-income neighborhoods.
- **Bridging Vision with Private Market and Funding.** Cities face a number of challenges in ensuring that developers are able to execute the station area plan vision. Issues include zoning, land assembly, the approvals process, attracting developers, and the need to ensure that the plan is grounded in market reality. At the same time, the plan needs to provide community benefits and funding for infrastructure, and cities stressed the need for financial tools to help ensure that the improvements are implemented.
- **Technical Implementation.** A range of technical issues include parking, urban design, integration of TOD into wider neighborhoods, and managing traffic and congestion. Two of the most important issues emerged as:
 - Parking – particularly appropriate parking ratios for new residential and commercial development; parking management policies such as shared parking; and the amount of park-and-ride provision that should be provided (see discussion in Chapter 4). Note that MTC's regional parking study, which is currently underway, will provide a range of resources and guidance that will help inform station area planning efforts.
 - Pedestrian design and feeder transit – particularly the relationship between parking and pedestrian facilities in the station area, and the need to fund identified infrastructure improvements.

Chapter 6 addresses some of the ways in which regional assistance may be available to help local jurisdictions overcome some of these barriers. Some educational and training resources will be available through the existing MTC consultant contract to evaluate and implement the TOD policy. Another option is a regional design review board or planning assistance committee that would assist and evaluate station area plans.

Figure 5-2 Barriers to TOD Identified by Grant Recipients

Balancing mixed use with retail and housing - market feasibility	Community involvement	Making opponents of TOD into supporters of TOD
Community amenities	Convincing neighbors with open space and other amenities	Getting elected officials to hold out for higher density
Parking and shared parking	Parcel assembly	Attracting developers
Financial feasibility of projects	Better refinancing TOD and potential benefits	New city elected officials – lack of continuity
Making appropriate housing product that fits into existing context	Getting elected officials to hear support from constituents	Incentives for TOD
Resisting pressure from developers to build at low density	Funding for parking structures/facilities	Having TOD help pay for operating cost of transit/station
Getting developers and property owners to support TOD vision	Transit agency wants higher density than cities	Finance public infrastructure improvements
Infrastructure – how to pay for what we need	Protecting historic neighborhoods	Level of service of transit – how to bring level of service up as TOD station area plan is being built
Meaningful opportunities for public input into process	Definition of transit in TOD (not just rail – feeder service too)	Engaging and working with surrounding neighborhoods
Balancing parking needs at station with pedestrian access	TOD vs. Transit Adjacent Development – will development be truly TOD?	Getting right mix across corridor
Fear of loss of blue collar jobs in industrial areas	Zoning and approvals process – difficult for developers	Making sure station area plans are implemented, especially by private developers
Balancing density with securing neighborhood support	Fear of residential developments on waterfront	Gentrification and displacement – who is benefiting especially in low income areas?

Preliminary Conclusions

As with the Corridor Working Groups, station area plans are at an early stage and a comprehensive evaluation is not yet possible. However, some initial conclusions can be reached regarding the success of this policy and potential refinements:

- **Importance to TOD policy.** Station Area Plans are emerging as critical to the TOD policy, and preliminary results regarding the range of densities and land-use concepts being considered are encouraging. MTC's decision to allow local jurisdictions to issue RFPs and engage consultants, rather than using a list of MTC pre-approved firms, appears to be paying dividends as it ensures that plans are locally owned and address specific local requirements.
- **Future planning cycles.** Any decision on future planning cycles should await firmer results from the first set of MTC-funded plans. However, depending on funding availability, MTC should consider requiring station area plans for all stations on the Resolution 3434 corridors – even if the housing threshold has been met – in order to address pedestrian access, parking and other issues. One suggestion is that a “revolving fund” be used for station area plans so that part of MTC's contribution is repaid by jurisdictions once development projects come in – potentially through planning fees levied on developers in the station area. In turn, this revenue would fund future station area planning projects. This would need to be considered in conjunction with potential future incentive payments.
- **Planning area.** While the ridership benefit from TOD outside the ½-mile radius is not as great as for development closer to the station, it still exists (see Chapter 2). At the same time, cities such as Santa Rosa have already found the need to adjust their station planning areas to encompass opportunity sites that are just outside the ½ mile radius. Potential pedestrian and bicycle access improvements are also often found outside the ½-mile radius. For these reasons, while the TOD policy threshold should still apply to the ½-mile radius, future station area plans should be able to encompass a wider area if appropriate.
- **Additional topics to include.** MTC's funding agreements with the initial station area planning grant recipients specified many detailed areas that plans needed to address, including parking ratios and market demand. Three additional topics that have been raised which might be usefully incorporated into future cycles include:
 - Transportation level of service (LOS) standards – for example, whether automobile LOS standards should be relaxed within a station area, multimodal LOS standards introduced, or “infill opportunity zones” designated which provide exemption from Congestion Management Program requirements.
 - A review of permitting and design review procedures, to ensure that developments consistent with the plan can move forward expeditiously.
 - An explicit examination of the tradeoffs between parking, new development and access improvements, using the Direct Ridership Model

- **Integration with other efforts.** Station area plans should be seen as part of wider Smart Growth efforts, rather than simply a device to ensure a minimum level of ridership on transit extensions. They can tie into initiatives such as Focusing Our Vision, which builds on the regional Smart Growth Strategy/Regional Livability Footprint Project. To assist in this integration, one option is for ABAG to assume responsibility for oversight of future station area plans.

Chapter 6. Other Regional Support for TOD

Station Area Planning grants offer one of the most tangible forms of regional support for transit-oriented development. However, local jurisdictions have identified a range of barriers to implementing station area plans that support transit ridership – and several ways in which additional regional assistance would be valuable. In addition, as discussed in Chapter 3, incentives are likely to be valuable in spurring local jurisdictions to go beyond the TOD policy threshold and maximize the amount of housing in station areas. Each of these avenues is discussed in turn in the following sections.

Technical Assistance and Training

Figure 6-1 shows the types of assistance that station area planning grantees considered would be valuable in helping them implement model plans to support TOD and transit ridership. There is a clear preference towards educational materials that can be used and adapted locally, rather than regional TOD workshops or other large-scale events. For example, self-guided tours of Bay Area TODs; a TOD Marketplace to bring together planners with potential developers; model zoning ordinances; and website information all attracted interest.

There was also an identified need for targeted technical assistance to supplement the resources available through station area plans. This could be addressed in several ways:

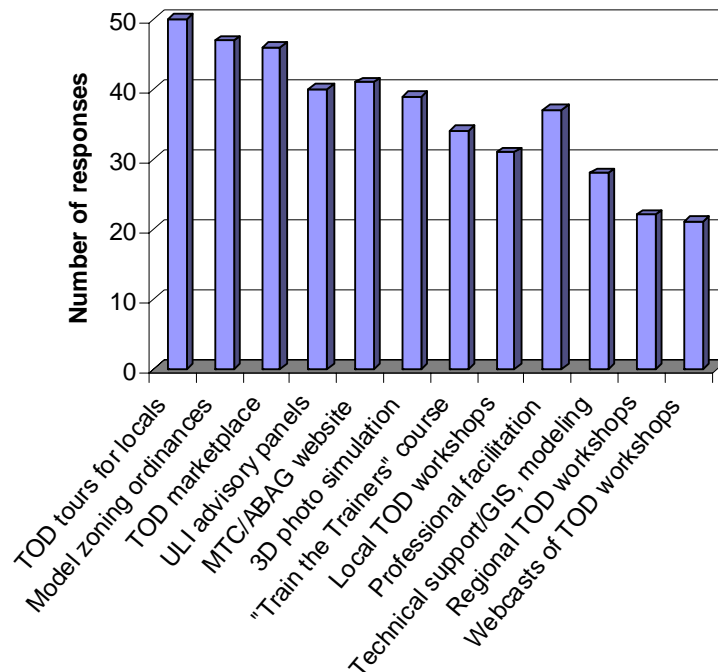
- A TOD Technical Assistance Program. MTC could make on-call assistance available on a limited basis to provide assistance with specific issues such as developing financial tools, public infrastructure improvements or parking.
- A regional design review or planning advisory board that would review station area plans.
- Direct local jurisdictions to other regional resources (discussed below).

MTC already has a range of existing efforts that support station area planning – notably the current regional parking study and the Transportation for Livable Communities/Housing Incentive Program. The wider challenge for MTC and ABAG is how to integrate with and leverage the efforts of other organizations that are providing or considering support services. Some examples include:

- The Joint Policy Committee's "Focusing Our Vision" effort
- Urban Land Institute tours, project case studies and expert panels
- A "TOD charrette" planned for April 2007 by the American Institute of Architects

- The Transportation and Land Use Coalition's "Great Communities Initiative," which aims to help educate local officials and mobilize communities to support station area plans
- Resources from the East Bay and San Francisco Community Foundations

Figure 6-1 Priorities for Regional Assistance



Source: Survey responses at March 30, 2006 meeting with Station Area Planning Grant recipients.

Chart includes all survey responses (including non-profit partners); priorities are ranked in order of local jurisdictions' responses.

* TOD Marketplace is a forum to bring together local planners and potential developers.

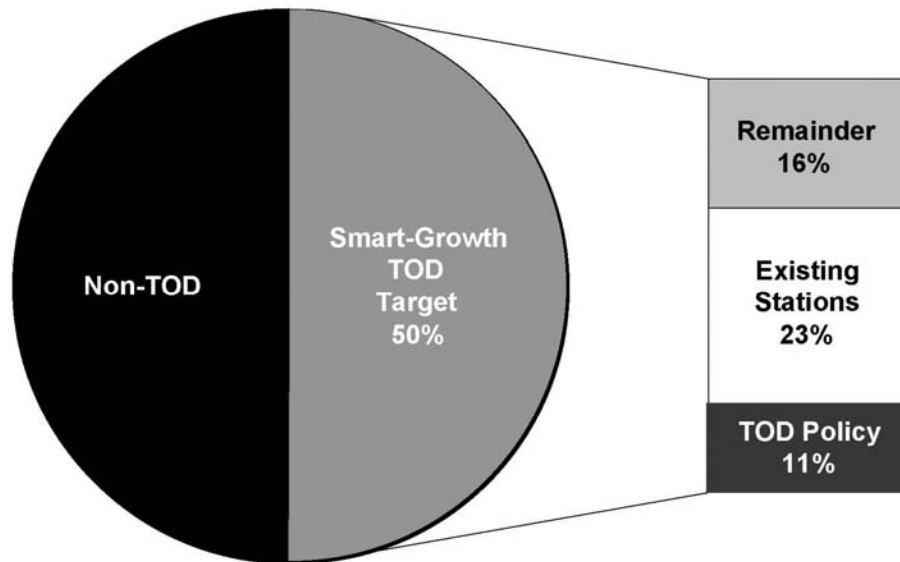
Incentives for Additional Housing

As discussed in Chapter 3, the housing unit thresholds are achievable for all the Resolution 3434 corridors. Assuming that raising the threshold for the existing Resolution 3434 corridors is not an option at this time, in order to avoid "moving the goalposts" on transit operators and local jurisdictions, there may be other opportunities for MTC to spur corridors to go above and beyond the minimum number of housing units.

As was discussed during the development of the TOD policy, it should be remembered that the Resolution 3434 transit extension corridors – even under MTC's housing thresholds – will only account for 11 percent of regional growth in population through

2030. Nearly twice as much growth will occur around the existing transit network, according to ABAG's Projections (Figure 6-2).

Figure 6-2 Projected Growth to 2030



These incentive programs also provide the opportunity to address concerns raised about the potential for local jurisdictions to backtrack on land-use commitments – for example, if a newly elected city council downzones station area land. Providing incentive payments only in concert with the groundbreaking of housing projects can help avoid this issue. At the same time, it would allow local jurisdictions to determine the most appropriate phasing and avoid difficulties in pushing for additional housing at a time when full funding for the transit extension is uncertain. A further level of certainty could be provided by requiring local jurisdictions to enter into an agreement with MTC at the time that corridor thresholds are confirmed. This would commit them to maintain the station area plan and zoning needed to achieve the thresholds for a set time period, in order to be eligible for incentive and similar funding.

The most obvious mechanism to provide these incentives is to redirect regional funding to reward local jurisdictions and corridors that significantly exceed the thresholds. Station area plans are likely to identify feeder transit, pedestrian and bicycle improvements that cannot be funded by existing programs, which would benefit from such incentive payments.

Funding sources could include the following:

- **Refocus existing programs.** MTC has a range of existing programs which could be retargeted to station area plans. Of particular interest are:
 - The Housing Incentive Program (HIP), which provides additional funding to local jurisdictions that approve new housing close to transit stops. Eligible uses of funds include bicycle, pedestrian and traffic calming projects, and transit stop amenities. HIP is part of the Transportation for Livable Communities (TLC) program, which aims to support community-based transportation projects that bring new vibrancy to downtown areas, commercial cores, neighborhoods, and transit corridors.
 - Safe Routes to Transit, which is funded through bridge toll revenue under Regional Measure 2. It funds projects that enhance pedestrian and bicycle access to transit stations.
- **Additional funding sources.** Measures on the State ballot in November 2006 may provide new sources of funding. These revenues, along with any others allocated through the Regional Transportation Plan, could be directed towards SuperHIP – an expanded version of the Housing Incentive Program. Alternatively, they could be linked directly to access improvements such as operating funds for shuttles, and/or capital funds for bicycle and pedestrian amenities, based on a Corridor Working Group strategic plan (Chapter 4). The specific ballot measures include:
 - *SB 1266 Transportation Bond.* The bond would provide an estimated \$264 million to the region in State Transportation Improvement Program (STIP) funding, and \$1.3 billion in Public Transportation Modernization and Improvement funding (most of which would be distributed to transit operators by formula). The bond also authorizes a range of other programs such as the State-Local Partnership Program, although most funding decisions would be made by the California Transportation Commission.
 - *SB 1689 Housing Bond.* Traditionally, MTC has only considered the transportation funds that are within its purview. However, the partnership with ABAG offers the opportunity to steer housing funds to station areas – such as the State affordable housing bond which will be on the ballot in November 2006. This bond includes \$850 million for “Regional Planning, Housing and Infill Incentives” and \$300 million for a Transit-Oriented Development Implementation Program, although the ballot measure does not specify how this funding would be distributed.

Pending further results from corridor-level analyses and individual station area plans, which will provide guidance on realistic levels of potential development, it is premature to propose specific thresholds at which these incentives might kick in. However, there are several principles which could be used to govern allocation of any incentive funding:

- A competitive process, whereby funding is allocated between corridors and stations dependent on the degree to which the threshold is exceeded. For example, tripling the number of housing units required under the TOD policy threshold could attract a higher award than doubling the number of units, while no incentives might be available below this level.
- Incentives allocated at both the corridor level, which the Corridor Working Group could allocate to access improvements at specific stations, and the station level.
- Provisions on TOD-specific parking ratios, effective parking management and TOD-specific street standards and transportation impact thresholds.
- Incentives for projects that exceed minimum density standards – for example, a project that achieves 100% of the allowable density would qualify for greater incentives than one that achieves 75% of the allowable density.

Chapter 7. Conclusions

This chapter summarizes the main conclusions discussed in earlier chapters, along with broader issues that will also affect the success of the TOD policy. While it is premature to offer specific recommendations for refining the TOD policy, this chapter does highlight some issues that should be considered by the Commission.

General Conclusions

1. TOD has broad benefits for both transit ridership and transit efficiency. Research at both the Bay Area and national level indicates that TOD yields an appreciable ridership bonus; in California, TOD residents are five times as likely to use transit for commute trips, compared to residents in the surrounding city. TOD also promotes system efficiency by generating transit trips at off-peak times or the reverse-peak direction when the marginal cost of accommodating them can be close to zero; and minimizes capital and operating costs for park-and-ride or feeder transit.

2. The TOD policy complements other policies that promote transit ridership. By focusing specifically on housing and station area planning, MTC's TOD policy complements other policies that govern new transit investments. For example, BART's System Expansion Policy and various farebox recovery requirements are intended to ensure that transit extensions generate sufficient ridership, and help to ensure that corridors plan for access beyond the ½-mile station area. However, since these thresholds can be met through park-and-ride and feeder transit provision, they do not necessarily mean that TOD and pedestrian access will be given priority. MTC's TOD policy may also provide incentives to relocate stations in the optimal location to encourage TOD, although corridors have not yet reached this iteration of planning.

3. Meeting TOD policy goals represents only part of the effort needed to ensure new transit extensions maximize ridership. For corridors that are not subject to external farebox recovery or ridership requirements, MTC could consider introducing a separate threshold to ensure a minimum level of system efficiency. Alternatively, MTC could provide Corridor Working Groups with the tools and funding to help them maximize ridership. This might include corridor strategic planning; application of the direct ridership model to analyze the tradeoffs between park-and-ride, other access modes and station area development; and development of a station typology to indicate the roles of each station within the corridor (e.g. employment center, park-and-ride node or residential center).

4. It is too early to analyze the full implications of the TOD policy. All corridors are making good progress towards meeting housing thresholds, and station area planning grant recipients have embraced the challenge of planning for TOD. Since none of the corridor housing thresholds have been certified, nor station area plans completed, it is not yet possible to evaluate the extent to which these plans fulfill both local and regional goals. However, it is clear that the MTC TOD policy is changing the way in which local jurisdictions think about and plan for their stations, focusing their attention on station area

development and access, and calling attention to the need for land-use intensification in station areas.

Housing Thresholds

5. The housing unit thresholds are achievable. Detailed analysis undertaken with input from local planning staff has confirmed that all corridors can meet the housing unit thresholds. In some corridors, meeting the thresholds has not required any change to local land-use policies, although in other corridors this requires continued planning and a commitment to adopt new station area plans and zoning. While concern has been expressed in some corridors that MTC is forcing urban density on suburban jurisdictions, this is simply not the case – the thresholds can be met with only moderate increases over existing allowable densities, even assuming that some stations on each corridor will accommodate little or no new development due to land-use conflicts. Much of this planning is underway or could be undertaken through an expansion of MTC's station area planning grant program.

6. MTC and ABAG need to agree on a clearer process to define and certify compliance with the TOD policy threshold. There are several methodological issues related to counting future housing units and the affordable housing bonus. These have been resolved using professional judgment in this evaluation; however, clearer guidelines and a process for ongoing monitoring will avoid potential future disagreements over whether a corridor meets the housing threshold.

7. MTC and ABAG should consider additional incentives to encourage local jurisdictions to surpass the housing unit thresholds. In some station areas, local jurisdictions are planning to significantly exceed the housing unit threshold. However, some others appear to view them as a target level that is to be reached but not surpassed. MTC should consider a layered system of incentives for planning, achieving the thresholds and surpassing them; an example is shown in Figure 7-1. Regardless, additional regional support for training and technical assistance would be valuable and help station areas maximize their potential. These incentives could be introduced at the corridor and/or the station level, with Corridor Working Groups able to direct a portion of funding to allow access improvements at stations that do not meet the station-level thresholds.

8. Incentives can help reduce the potential for cities to reverse land-use decisions. Rather than punitive sanctions to deter cities from reversing land-use decisions (for example, on election of a new city council), these incentives can help reward cities that maintain TOD zoning policies. If some incentives are payable only on groundbreaking of new units (for example, through a strengthened Housing Incentive Program), the risk of non-compliance is avoided.

9. Employment thresholds are not appropriate. Cities already have considerable incentives to zone for non-residential uses, such as sales tax revenue and reduced fiscal impacts. Many are already planning for significant employment around transit lines. Moreover, employment uses work best in promoting transit ridership when they are

concentrated at key hubs at higher densities, rather than dispersed through a corridor. Finally, there is a compliance problem with employment thresholds. Jobs are difficult to quantify and highly flexible. For example, an office complex that might accommodate up to 1,000 employees may, for long periods, house only a fraction of that total. This makes certification of employment thresholds extremely difficult and costly. This suggests an increased focus on employment in specific station area plans, rather than a corridor-level threshold which in any case would need to be matched to local estimates of market demand. MTC should ensure that station area plans make provision for employment levels that are consistent with market assessments, taking into account the amount of employment that is planned outside station areas in a corridor.

Figure 7-1 Potential Layered Incentives for TOD

Milestone	Incentives
Conduct station area plans	Station Area Planning Grants TOD training and technical assistance Additional planning funds – for example, if station site is moved to accommodate more TOD
Achieving housing unit threshold	MTC certification that corridor complies – allows construction to proceed
Significantly* surpassing housing unit threshold (plans adopted)	Funding from State affordable housing bond**
Significantly* surpassing housing unit threshold (groundbreaking)	SuperHIP funding for station access improvements

*To be defined

** Subject to voter approval of bond in November 2006

Station Area and Corridor Planning

10. Station area plans are emerging as the critical vehicle to tackle a range of access and development issues. Parking is a particularly important issue that has a major impact on transit ridership. Since none will be completed before the end of this year, it is premature to evaluate their effectiveness. However, there are some useful additions that may be made to any future grant cycles, including considering access improvements outside the ½ mile station area.

11. Ferries. MTC staff and consultants are currently undertaking more detailed analysis of the potential for ferry terminals to meet TOD thresholds, and options for refining the TOD policy as it relates to ferries are likely to result from this work. One specific issue relates to whether ferries should be treated as one or more “corridors,” or whether each ferry terminal should be required to meet the housing threshold, with possible exemptions for sites with land-use conflicts.

12. Land banking is an issue that has yet to be fully addressed. Concerns have been raised that the lack of certainty over transit extensions has prevented local jurisdictions from

achieving the maximum potential for housing units, due to developer or community fears that the transit will never materialize. Land banking may provide one mechanism to address this, provided that the transit agency has a policy that provides for subsequent development on surface parking facilities. More detailed work on this issue will be undertaken this year in the SVRT corridor. Preliminary evidence from station area plans is that communities are finding a range of reasons to build walkable neighborhoods with a sense of place, even in advance of the transit extension. However, regions that have made recent investments in transit extensions, such as Minneapolis, have found that the land-use response is far greater once the transit investment is built or made certain. In the Bay Area, experience suggests that TOD projects pivot off proven examples. In Hayward, for example, proposals for South Hayward BART are now being made at far higher densities than were achieved at the downtown Hayward TOD, while in Union City, developers are suggesting higher densities than the current zoning allows, now that there are proven examples to reference.

13. Corridor Working Groups may not be achieving their full potential. The original rationale for the groups – to help develop consensus on the allocation of new housing units between different stations along the corridor – remains undiminished. However, there is little incentive for Corridor Working Groups to continue to meet once there is a clear path to ensuring that the housing thresholds are met. To help them contribute to surpassing the thresholds, they could be given additional tasks such as determining how to maximize ridership and prioritizing access improvements across stations. Additional incentive programs, such as the enhanced HIP program outlined above, would be one example of an additional task for the CWGs.

APPENDIX A

MTC RESOLUTION 3434 TOD POLICY

MTC RESOLUTION 3434 TRANSIT-ORIENTED DEVELOPMENT (TOD) POLICY FOR REGIONAL TRANSIT EXPANSION PROJECTS

Adopted July 27, 2005

1. PURPOSE

The San Francisco Bay Area — widely recognized for its beauty and innovation — is projected to grow by almost two million people and one and a half million jobs by 2030. This presents a daunting challenge to the sustainability and the quality of life in the region. Where and how we accommodate this future growth, in particular where people live and work, will help determine how effectively the transportation system can handle this growth.

The more people who live, work and study in close proximity to public transit stations and corridors, the more likely they are to use the transit systems, and more transit riders means fewer vehicles competing for valuable road space. The policy also provides

support for a growing market demand for more vibrant, walkable and transit convenient lifestyles by stimulating the construction of at least 42,000 new housing units along the region's major new transit corridors and will help to contribute to a forecasted 59% increase in transit ridership by the year 2030.

This TOD policy addresses multiple goals: improving the cost-effectiveness of regional investments in new transit expansions, easing the Bay Area's chronic housing shortage, creating vibrant new communities, and helping preserve regional open space. The policy ensures that transportation agencies, local jurisdictions, members of the public and the private sector work together to create development patterns that are more supportive of transit.

TABLE 1: Resolution 3434 Transit Extension Projects Subject to Corridor Thresholds

PROJECT	SPONSOR	TYPE	THRESHOLD IS MET WITH CURRENT DEVELOPMENT?
BART East Contra Costa Rail Extension	BART/CCTA	Commuter Rail	No
BART — Downtown Fremont to San Jose/Santa Clara (a) Fremont to Warm Springs (b) Warm Springs to San Jose/ Santa Clara	(a) BART (b) VTA	BART extension	No
AC Transit Berkeley/Oakland/ San Leandro Bus Rapid Transit: Phase 1	AC Transit	Bus Rapid Transit	Yes
Caltrain Downtown Extension/Rebuilt Transbay Terminal	TJPA	Commuter Rail	Yes
MUNI Third Street Light Rail Transit Project Phase 2 — New Central Subway	MUNI	Light Rail	Yes
Sonoma-Marin Rail	SMART	Commuter Rail	No
Dumbarton Rail	SMTA, ACCMA, VTA, ACTIA, Capitol	Corridor Commuter Rail	No
Expanded Ferry Service Phase 1: Berkeley, Alameda/Oakland/Harbor Bay, and South San Francisco to San Francisco (Note 1)	WTA	Ferry	No
Expanded Ferry Service Phase 2: Alameda to South San Francisco, and Hercules, Antioch, Treasure Island, Redwood City and Richmond to San Francisco (Note 1)	WTA	Ferry	No

Note 1: The WTA Ferry Expansion "Corridor" for the purposes of the TOD policy consists of all new terminals planned in Phase 1 and Phase 2.

There are three key elements of the regional TOD policy:

- (a) Corridor-level thresholds to quantify appropriate minimum levels of development around transit stations along new corridors;
- (b) Local station area plans that address future land use changes, station access needs, circulation improvements, pedestrian-friendly design, and other key features in a transit-oriented development; and
- (c) Corridor working groups that bring together CMAs, city and county planning staff, transit agencies, and other key stakeholders to define expectations, timelines, roles and responsibilities for key stages of the transit project development process.

2. TOD POLICY APPLICATION

The TOD policy only applies to physical transit extensions funded in Resolution 3434 (see Table 1). The policy applies to any physical transit extension project with regional discretionary funds, regardless of level of funding. Resolution 3434 investments that only entail level of service improvements or other enhancements without physically extending the system are not subject to the TOD policy requirements. Single station extensions to international airports are not subject to the TOD policy due to the infeasibility of housing development.

3. DEFINITIONS AND CONDITIONS OF FUNDING

For purposes of this policy “regional discretionary funding” consists of the following sources identified in the Resolution 3434 funding plan:

- FTA Section 5309- New Starts
- FTA Section 5309- Bus and Bus Facilities Discretionary
- FTA Section 5309- Rail Modernization
- Regional Measure 1- Rail (bridge tolls)
- Regional Measure 2 (bridge tolls)
- Interregional Transportation Improvement Program
- Interregional Transportation Improvement Program- Intercity rail
- Federal Ferryboat Discretionary
- AB 1171 (bridge tolls)
- CARB-Carl Moyer/AB434 (Bay Area Air Quality Management District)*

These regional funds may be programmed and allocated for environmental and design related work, in preparation for addressing the requirements of the TOD policy. Regional funds may be programmed and allocated for right-of-way acquisition in advance of meeting all requirements in the policy, if land preservation for TOD or project delivery purposes is essential. No regional funds will be programmed and allocated for construction until the requirements of this policy have been satisfied. See Table 2 for a more detailed overview of the planning process.

TABLE 2: Regional TOD Policy Implementation Process for Transit Extension Projects

TRANSIT AGENCY ACTION	CITY ACTION	MTC/CMA/ABAG ACTION
<i>All parties in corridors that do not currently meet thresholds (see Table 1) establish Corridor Working Group to address corridor threshold. Conduct initial corridor performance evaluation, initiate station area planning.</i>		
Environmental Review/ Preliminary Engineering/ Right-of-Way	Conduct Station Area Plans	Coordination of corridor working group, funding of station area plans
Step 1 Threshold Check: <i>the combination of new Station Area Plans and existing development patterns exceeds corridor housing thresholds .</i>		
Final Design	Adopt Station Area Plans. Revise general plan policies and zoning, environmental reviews	Regional and county agencies assist local jurisdictions in implementing station area plans
Step 2 Threshold Check: <i>(a) local policies adopted for station areas; (b) implementation mechanisms in place per adopted Station Area Plan by the time Final Design is completed.</i>		
Construction	Implementation (financing, MOUs) Solicit development	TLC planning and capital funding, HIP funding

* The Carl Moyer funds and AB 434 funds are controlled directly by the California Air Resources Board and Bay Area Air Management District. Res. 3434 identifies these funds for the Caltrain electrification project, which is not subject to the TOD policy.

4. CORRIDOR-LEVEL THRESHOLDS

Each transit extension project funded in Resolution 3434 must plan for a minimum number of housing units along the corridor. These corridor-level thresholds vary by mode of transit, with more capital-intensive modes requiring higher numbers of housing units (see Table 3). The corridor thresholds have been developed based on potential for increased transit ridership, exemplary existing station sites in the Bay Area, local general plan data, predicted market demand for TOD-oriented housing in each county, and an independent analysis of feasible development potential in each transit corridor.

- Meeting the corridor level thresholds requires that within a half mile of all stations, a combination of existing land uses and planned land uses meets or exceeds the overall corridor threshold for housing (listed in Table 3);
- Physical transit extension projects that do not currently meet the corridor thresholds with development that is already built will receive the highest priority for the award of MTC’s Station Area Planning Grants.
- To be counted toward the threshold, planned land uses must be adopted through general plans, and the appropriate implementation processes must be put in place, such as zoning codes. General plan language alone without supportive implementation policies, such as zoning, is not sufficient for the purposes of this policy. Ideally, planned land uses will be formally adopted through a specific plan (or equivalent), zoning codes and general plan amendments along with an accompanying programmatic Environmental Impact Report (EIR) as part of the overall station area planning process. Minimum densities will be used in the calculations to assess achievement of the thresholds.
- An existing end station is included as part of the transit corridor for the purposes of calculating the corridor thresholds; optional stations will not be included in calculating the corridor thresholds.

- New below-market housing units will receive a 50 percent bonus toward meeting the corridor threshold (i.e. one planned below-market housing unit counts for 1.5 housing units for the purposes of meeting the corridor threshold. Below market for the purposes of the Resolution 3434 TOD policy is affordable to 60% of area median income for rental units and 100% of area median income for owner-occupied units);
- The local jurisdictions in each corridor will determine job and housing placement, type, density, and design.
- The Corridor Working Groups are encouraged to plan for a level of housing that will significantly exceed the housing unit thresholds stated here during the planning process. This will ensure that the Housing Unit Threshold is exceeded corridor-wide and that the ridership potential from TOD is maximized.

5. STATION AREA PLANS

Each proposed physical transit extension project seeking funding through Resolution 3434 must demonstrate that the thresholds for the corridor are met through existing development and adopted station area plans that commit local jurisdictions to a level of housing that meets the threshold. This requirement may be met by existing station area plans accompanied by appropriate zoning and implementation mechanisms. If new station area plans are needed to meet the corridor threshold, MTC will assist in funding the plans. The Station Area Plans shall be conducted by local governments in coordination with transit agencies, Association of Bay Area Governments (ABAG), MTC and the Congestion Management Agencies (CMAs).

Station Area Plans are opportunities to define vibrant mixed use, accessible transit villages and quality transit-oriented development – places where people will want to live, work, shop and spend time. These plans should incorporate mixed-use developments, including new housing, neighborhood serving retail, employment, schools, day care centers, parks and other amenities to serve the local community.

TABLE 3: Corridor Thresholds Housing Units — Average per Station Area

Project Type	BART	Light Rail	Bus Rapid Transit	Commuter Rail	Ferry
Housing Threshold	3,850	3,300	2,750	2,200	750

Each corridor is evaluated for the Housing Threshold. For example, a four station commuter rail extension (including the existing end-of-the-line station) would be required to meet a corridor-level threshold of 8,800 housing units.

Threshold figures above are an average per station area based on both existing land uses and planned development within a half mile of all stations. New below market rate housing is provided a 50% bonus towards meeting housing unit threshold.

At a minimum, Station Area Plans will define both the land use plan for the area as well as the policies—zoning, design standards, parking policies, etc.—for implementation. The plans shall at a minimum include the following elements:

- Current and proposed land use by type of use and density within the half-mile radius, with a clear identification of the number of existing and planned housing units and jobs;
- Station access and circulation plans for motorized, non-motorized and transit access. The station area plan should clearly identify any barriers for pedestrian, bicycle and wheelchair access to the station from surrounding neighborhoods (e.g., freeways, railroad tracks, arterials with inadequate pedestrian crossings), and should propose strategies that will remove these barriers and maximize the number of residents and employees that can access the station by these means. The station area and transit village public spaces shall be made accessible to persons with disabilities.
- Estimates of transit riders walking from the half mile station area to the transit station to use transit;
- Transit village design policies and standards, including mixed use developments and pedestrian-scaled block size, to promote the livability and walkability of the station area;
- TOD-oriented parking demand and parking requirements for station area land uses, including consideration of pricing and provisions for shared parking;
- Implementation plan for the station area plan, including local policies required for development per the plan, market demand for the proposed development, potential phasing of development and demand analysis for proposed development.

The Station Area Plans shall be conducted using existing TOD design guidelines that have already been developed by ABAG, local jurisdictions, transit agencies, the CMAs and others. MTC will work with ABAG to provide more specific guidance on the issues listed above that must be addressed in the station area plans and references and information to support this effort. MTC is conducting an analysis of parking policies that will be made available when complete, and shall be considered in developing local parking policies for TODs.

6. CORRIDOR WORKING GROUPS

The goal of the Corridor Working Groups is to create a more coordinated approach to planning for transit-oriented development along Resolution 3434 transit corridors. Each of the transit extensions subject to the corridor threshold process, as identified in Table 1, will need a Corridor Working Group, unless the current level of development already meets the corridor threshold. Many of the corridors already have a transit project working group that may be adjusted to take on this role. The Corridor Working Group shall be coordinated by the relevant CMAs, and will include the sponsoring transit agency, the local jurisdictions in the corridor, and representatives from ABAG, MTC, and other parties as appropriate.

The Corridor Working Group will assess whether the planned level of development satisfies the corridor threshold as defined for the mode, and assist in addressing any deficit in meeting the threshold by working to identify opportunities and strategies at the local level. This will include the key task of distributing the required housing units to each of the affected station sites within the defined corridor. The Corridor Working Group will continue with corridor evaluation, station area planning, and any necessary refinements to station locations until the corridor threshold is met and supporting Station Area Plans are adopted by the local jurisdictions.

MTC will confirm that each corridor meets the housing threshold prior to the release of regional discretionary funds for construction of the transit project.

7. REVIEW OF THE TOD POLICY

MTC staff will conduct a review of the TOD policy and its application to each of the affected Resolution 3434 corridors, and present findings to the Commission, within 12 months of the adoption of the TOD policy.

FOR MORE INFORMATION

James Corless • jcorless@mtc.ca.gov • 510.817.5709
Valerie Knepper • vknepper@mtc.ca.gov • 510.817.5824



METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.817.5700
TDD/TTY: 510.817.5769
Fax: 510.817.5848
e-mail: info@mtc.ca.gov
Web site: www.mtc.ca.gov

APPENDIX B

CASE STUDIES

Appendix B – Case Studies

Hudson-Bergen Light Rail Line – New Jersey



New development on the Hudson-Bergen line.
Photo: Gorewitz, 9/05



Hoboken, NJ. Photo: Wells & Robins, 2005.

Jersey City and Hoboken lie just across the Hudson River from New York City. Both communities are older residential, industrial and commercial centers which experienced a period of decline before a redevelopment revival began in the 1980s. This was partly a response to escalating housing costs in New York City, aided by redevelopment initiatives and improved transit connections – including ferry service across the Hudson.

Phase 1 of the Hudson-Bergen Light Rail Line opened in 2000, running from Hoboken to Bayonne. As well as connecting New Jersey communities, the line provides transfers to commuter rail services into New York City.

In large part, the line originally ran through abandoned or obsolete industrial sites. Construction has been brisk around stations – developments are proposed for every single piece of property around the 9th Street station in Hoboken, for example. Around the Jersey City stations, commercial development dominates – including the 42-story Goldman Sachs tower.

Figure B-1 shows housing, employment and ridership for the four stations studied by the Center for Transit-Oriented Development (CTOD). Demographic data are for the ½ mile radius based on 2000 census data, and therefore do not reflect recent development – between 2000 and 2005, 4,164 more units were built in the four station areas, with hundreds more planned. While it is difficult to discern the direct ridership impact, patronage

rose 30% between 2003 and 2005, and light rail capacity was planned to double in 2006. Vehicle ownership in the station areas ranged from 0.6 to 0.8 vehicles per household.

Even in 2000, all station areas considered comfortably exceeded MTC's TOD threshold for light rail of 3,300 units per station area. At Hoboken 9th Street, the number of housing units

was almost triple the threshold. The station areas also include a large amount of employment – nearly 15,000 employees at Hoboken 9th Street.

Figure B-1 Hudson-Bergen Station Areas

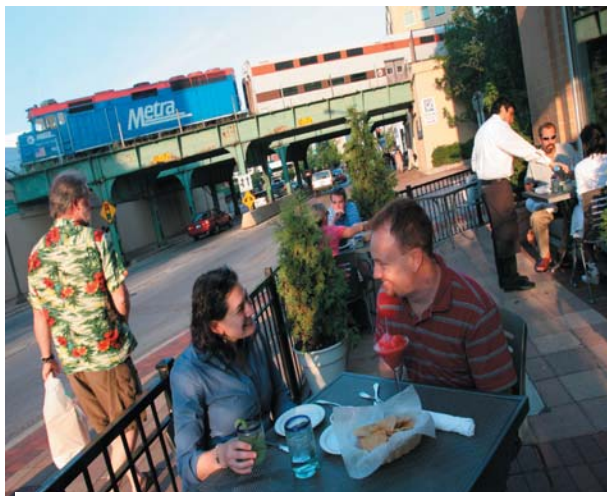
Station	Occupied Housing Units	Employees	Ridership (2005)	% Difference from MTC TOD Policy Threshold
Hoboken - 9th St	12,973	14,212	594	+ 293%
Jersey City - Marin Blvd	6,006	6,042	362	+ 82%
Jersey City - Jersey Ave	5,756	6,197	439	+ 74%
Jersey City - Essex St	3,517	3,132	831	+ 7%
Mean	7,063	7,396	557	+ 114%

Source: Wells & Robins, 2005. Demographic data are based on 2000 census for ½ mile station radius.

Evanston, Illinois



Evanston transit village. Photo: Gorewitz, 9/05



Evanston transit village.
Photo: Makarewicz & Benedict, 2005.

Evanston is a close-in Chicago suburb on the Lake Michigan shore that is home to Northwestern University and lies on the Chicago Transit Authority and Metra rail corridors. Similar to many other communities in the inner suburban ring of Chicago, it was losing population through the 1980s.

In response, a 1986 comprehensive plan, followed by a more specific 1989 downtown plan and zoning code revision, provided for higher-density mixed-use development near stations, with lower parking ratios. The city also made several major infrastructure investments, including a transportation center to ease interchange between rail and bus. By 2005, about 2,500 new residential units had been constructed, along with a large amount of non-residential space. Assessed values, meanwhile, rose by 191% between 1985 and 2004, enabling the city to lower its property tax rates.

The amount of development near transit has not only promoted ridership, but also ensured that autos account for a small share of station access trips. A 2002 Metra survey found that 74% of riders walk or bike to the Main and Davis stations, compared to an average of 34% for other suburban stations on the line.

Within ½ mile of the rail stations, 38% of residents take transit to work and vehicle ownership averages 1.1 per household.

Three of the four station areas considered comfortably exceeded MTC's TOD threshold for commuter rail of 2,200 units per station area by a factor of two or more (Figure B-2).

Figure B-2 Evanston Station Areas

Station	Households	2002 Ridership		% Difference from MTC TOD Policy Threshold
		CTA	Metra	
S Blvd	5,307	249,180	N/A	+ 141%
Main	5,230	382,557	199,940	+ 138%
Dempster	4,381	231,180	N/A	+ 99%
Davis	1,849	1,173,536	374,140	-16%
<i>Mean</i>	<i>4,192</i>	<i>509,113</i>	<i>287,040</i>	<i>+ 91%</i>

Source: CTOD. Demographic data are based on 2000 census for ½ mile station radius.

New Jersey Transit Villages

Bound Brook Transit Village, New Jersey

Photo: Nelson\Nygaard

The New Jersey Transit Village initiative was established to help “redevelop and revitalize communities around transit facilities to make them an appealing choice for people to live, work and play, thereby reducing reliance on the automobile.” One of the core goals is to bring more housing and employment into station areas, given that “an increase in residential housing options within walking distance of a transit facility, typically a one quarter to one half mile radius, does more to increase transit ridership than any other type of development,” according to the New Jersey Department of Transportation.¹

The original seven villages, designated from 1999 to 2002, were supplemented with nine villages designated between 2003 and 2005. Transit Village status confers a range of benefits, including priority State funding and technical assistance. Grant funding worth \$1 million annually is available for designated Transit Villages.

As part of the initiative, a team at Rutgers University’s Voorhees Transportation Center has been conducting ongoing monitoring of several performance measures in each transit village. The research includes analysis of census data, building permits, resident and business surveys, and transportation network connectivity within the ½ mile radius of each station. The findings to date include:

- Transit Villages tend to have higher street connectivity, which is a measure of pedestrian friendliness. Most of the villages were laid out in the 19th century when grid patterns were predominant, in contrast to postwar development. Compared with

¹ See: www.state.nj.us/transportation/community/

a random sample of 20 other sites, transit villages accounted for 15 of the 16 most connected street networks.

- Transit Villages attracted more than \$500 million in construction activity from 1999 to 2004 – nearly two-thirds of which was non-residential. During the same period, 879 net housing units were added.
- Some Transit Villages have proven more successful than others. Some have encountered unexpected delays and some have failed to attract substantial investment, the researchers concluded.

Figure B-3 shows the demographic data for each station area. Of the 16 Transit Villages, 10 exceed the MTC TOD threshold (for heavy rail, the commuter rail threshold of 2,200 units is used). The average number of units per station area in 2000 was 3,558.

Performance also varies significantly in terms of transit mode share and vehicle ownership. In some Transit Villages – Rutherford, South Orange, Journal Square, Matawan and Metuchen – more than 20% of station area residents take transit to work. In others, notably Bound Brook, transit accounts for a minimal share of commute trips.

Figure B-3 New Jersey Transit Villages

Station	Housing Units	Transit Commute Share	Vehicles/Hhold	Transit Frequency (1)	Ridership	Technology	% Difference from MTC TOD Policy Threshold
Journal Sq	15,487	46.6%	0.6	522	21,000	Multiple (2)	+302%
New Brunswick	4,844	12.9%	1.5	92	5,136	Heavy rail	+120%
Rutherford	4,205	22.0%	1.4	171	669	Heavy rail	+91%
Rahway	3,595	14.3%	1.3	37	N/A	Heavy rail	+63%
S Orange	3,554	23.1%	1.5	70	2,169	Heavy rail	+62%
Morristown	3,399	7.3%	1.3	71	1,825	Heavy rail	+55%
Belmar	3,231	4.4%	1.5	20	361	Heavy rail	+47%
Bloomfield	2,899	14.2%	1.1	491	712	Heavy rail	+32%
Metuchen	2,352	20.9%	1.7	47	3,678	Heavy rail	+7%
S Amboy	2,324	7.5%	1.1	62	1,190	Heavy rail	+6%
Pleasantville	2,646	19.9%	1.2	164	N/A	Bus	-4%
Collingswood	1,952	13.3%	1.5	53	1,545	Heavy rail	-11%
Cranford	1,735	15.1%	1.7	90	992	Heavy rail	-21%
Riverside	2,548	(3)	1.5	61	N/A	Light rail	-23%
Bound Brook	1,569	3.0%	1.5	52	609	Heavy rail	-29%
Matawan	591	20.3%	1.4	26	3,060	Heavy rail	-73%
<i>Mean</i>	<i>3,558</i>	<i>16.3%</i>	<i>1.4</i>	<i>127</i>	<i>3,304</i>		<i>+39%</i>

(1) One-way weekday departures

(2) Assessed against BART threshold (3,850 units)

(3) Light rail line opened after 2000, when census data were collected, so no commute mode share figure is given here.

Ridership is measured in average weekday boardings

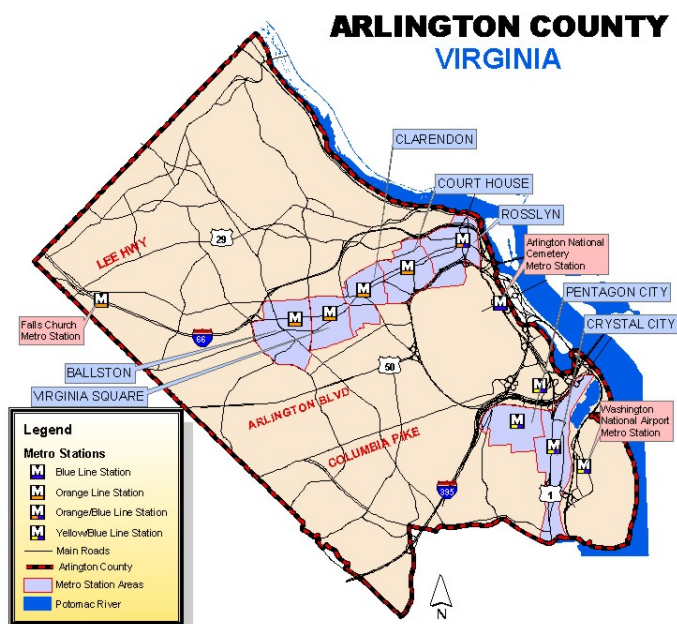
Source: Wells & Lombardi, 2005, based on census data for the ½ mile station radius.

Rosslyn-Ballston Corridor, Arlington County

Arlington County, Virginia is an inner suburb in the Washington, DC region, located across the Potomac River from the District of Columbia. The County's development policies over the past 30 years have turned Arlington into one of the best United States-based case studies of intense development designed to maximize the benefits of a new rail line.

The County's TOD initiative on the Rosslyn-Ballston (R-B) Corridor was undertaken in tandem with planning for Metro's Orange Line, which opened in 1979. In the 1970s, the County's population and sales tax revenues were declining, faced with competition from more distant suburbs. The R-B corridor lost 36% of its population between 1972 and 1980. Rather than a freeway median alignment, the County successfully pressed for an underground rail line to penetrate the heart of the corridor, allowing for redevelopment opportunities close to transit. The County contributed more than \$100 million to these costs.

The sheer quantity of development is striking. From 1972 to 2002, the amount of office space increased from 4.9 million to 21.1 million square feet. The number of housing units nearly doubled over the same period. Development is highly concentrated above and adjacent to rail stations – at Virginia Square station, for example, 180-foot residential towers step down rapidly to adjacent single-family neighborhoods. A mix of uses has been ensured by innovative policies such as site plan review, and special zoning districts that require developers to build residential space first before they are permitted to build the maximum allowable office density. The County has also promoted transit ridership and managed traffic through requiring developers to implement Transportation Demand Management measures such as market-rate parking pricing, and fund pedestrian and other streetscape improvements. Parking requirements are reduced close to stations, and waived altogether for some smaller projects.



Above: Court House station, Arlington County

Photo: Nelson\Nygaard

Left: Metro Station Areas in Arlington County

Source: Leach (2003)

At the same time, the County has sought to preserve many of its older residential neighborhoods, and protect them from parking overspill and other impacts from new development around transit. These neighborhoods have benefited from substantial reinvestment.

Figure B-4 shows the amount of development within each station area, together with the County's forecasts for 2030 (which are used as inputs for regional planning work). Note that station areas are defined using the County's geography (illustrated on the map above), and generally encompass the area within $\frac{1}{4}$ mile walk of each station. Station areas are also smaller since stations are closely spaced, and the figures presented here do not include any overlap between stations.

As can be seen, the corridor as a whole exceeds the housing threshold by 30%, while also accommodating a great deal of employment. This is despite the definition of station area that is used, which tends to be smaller than the $\frac{1}{2}$ -mile radius used in MTC's policy. While two stations – Clarendon and Virginia Square – do not currently meet MTC's TOD policy threshold, they are forecast to by 2030. The rate of growth in the R-B corridor is forecast to be three times that of the county as a whole.

The corridor's performance, however, can also be quantified in economic and transportation terms. From both perspectives, it has been a resounding success:

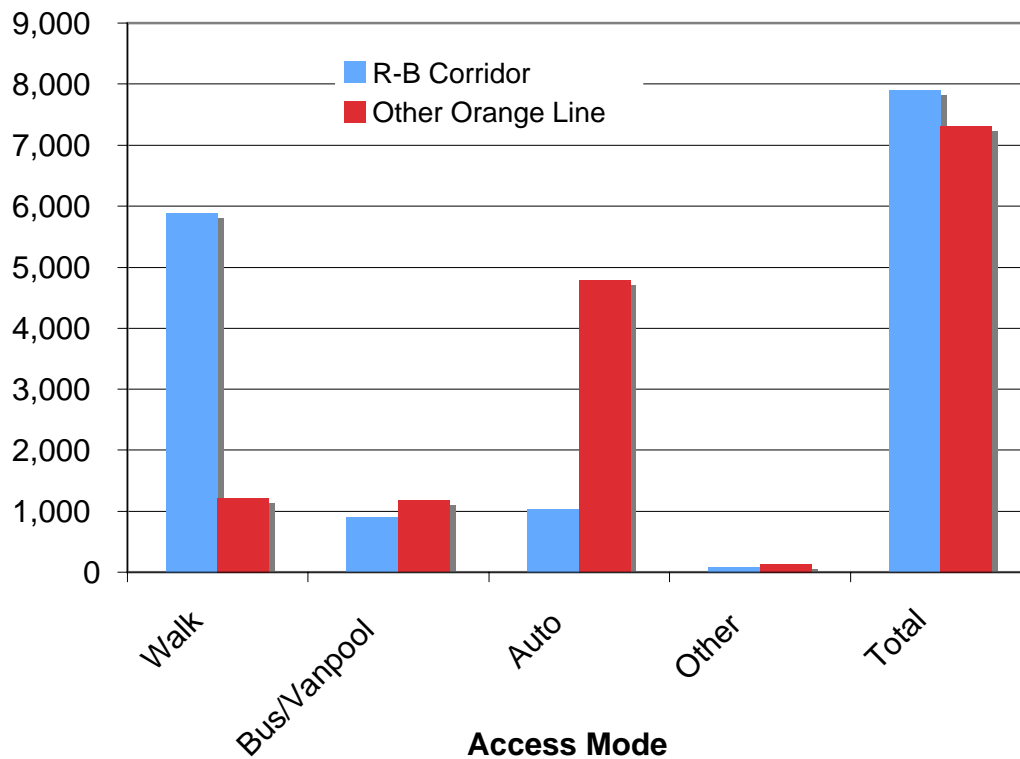
- Office developments have had very low vacancy rates. In June 2002, for example, the 5% vacancy rate on the R-B corridor was half that at more auto-oriented centers in suburban Virginia, such as Tysons Corner. Rents command a premium over other suburban centers.
- Assessed value increased by 81% from 1992 to 2002. One-third of the County's real estate taxes are generated in the R-B corridor, which accounts for 8% of its land area. This redevelopment has helped Arlington maintain a AAA bond rating and some of the lowest real estate tax rates in Northern Virginia.
- Walking accounts for the vast majority of access trips. Compared with the freeway median stations further west on the Orange Line, R-B corridor stations not only have higher ridership but more than five times as many walk access trips (Figure B-5). While some land in the R-B corridor was used initially for parking for commuters, the last two remaining lots had been redeveloped by 2002. While commuters may park in public garages (e.g. at Ballston), they are charged the same rates as other all-day parkers, currently \$8 per day.
- New development has led to little increase in traffic congestion. County research has shown that office and residential projects in station areas generate fewer trips than their auto-oriented equivalents, and residents tend to own fewer vehicles.

Figure B-4 Rosslyn-Ballston Station Area Development

Station	Transit Commute Share (Residents)	Forecast Housing Units		Forecast Jobs		% over MTC Threshold*	
		2005	2030	2005	2030	2005	2030
Rosslyn	39%	6,407	10,287	28,595	43,313	+66%	+167%
Court House	43%	6,444	8,628	13,795	18,003	+67%	+124%
Clarendon	31%	2,137	4,291	6,724	9,556	-44%	+11%
Virginia Square	31%	2,790	4,692	7,123	10,522	+28%	+22%
Ballston	36%	7,332	9,032	26,820	37,029	+90%	+135%
<i>Average</i>	<i>36%</i>	<i>5,022</i>	<i>7,386</i>	<i>16,611</i>	<i>23,685</i>	<i>+30%</i>	<i>+92%</i>

*Assessed against BART threshold (3,850 units)

Source: Arlington County Planning Information Report 58, June 2004.

Figure B-5 Daily Boardings per Station by Access Mode

Note: Figures refer to averages for the five R-B Corridor Stations (39,500 daily boardings) and the four Orange Line stations to the west (29,250 daily boardings).

Data source: May 2002 weekday Metrorail ridership and access data, WMATA, in Leach (2003).

California Transit-Oriented Development

The California Department of Transportation (Caltrans) has begun to compile a best practice database of California TODs. Each case study provides a brief profile of the station area development, as well as performance figures (where available) such as ridership, number of housing units within a half mile, and vehicle ownership.



Hollywood/Highland TOD, Los Angeles, has more than 13,000 in the ½ mile station area.

Photo: Caltrans

Rather than providing a detailed case study of a particular transit line, then, the Caltrans database enables comparison of a broad section of TODs from different regions within the State, including Sacramento, Los Angeles and the San Francisco Bay Area. Figure B-6 shows the results.

Taken as a whole, California TODs are just shy (4%) of meeting the relevant TOD threshold for each type of transit technology. However, individually, most do not achieve it – the only exceptions are Caltrain's San Antonio Road station, and Hollywood/Highland station on the Red Line in Los Angeles.

Figure B-6 California Station Area Development

	Households Within ½ Mile*	Transit Commute Share	Vehicles/ Hhold	Average Weekday Boardings	Technology	% Difference from MTC TOD Policy Threshold
Red Line – Hollywood/Highland	13,073	12%	0.9	3,800	Subway**	+240%
Caltrain – San Antonio Rd	3,617	9%	1.5	841	Commuter Rail	+64%
Metrolink – Sylmar	2,150	6%	2.0	N/A	Commuter Rail	-2%
San Diego Trolley – American Plaza	3,162	9%	1.0	3,422	Light rail	-4%
Sacramento – Lima Park	2,588	13%	0.7	3,260	Light rail	-22%
Blue Line – Willow	2,486	8%	1.5	2,467	Light rail	-25%
Gold Line – Memorial Park	2,332	4%	1.4	N/A	Light rail	-29%
VTA Light Rail – Ohlone-Chynoweth	1,779	4%	2.1	1,924	Light rail	-46%
VTA Light Rail – Whisman Station	1,600	3%	1.7	90	Light rail	-52%
Los Angeles – Union Station	1,786	18%	0.6	11,953	Multiple**	-54%
San Diego Trolley – La Mesa	1,484	2%	1.8	334	Light rail	-55%
San Diego Trolley – Rio Vista West	1,299	2%	1.5	296	Light rail	-61%
Mean	3,113	8%	1.4	2,839		-4%

** The original Caltrans data consider the area within roughly a half-mile walk of each station, taking into account physical barriers such as freeways and rivers. The actual acreage considered in each station area ranges from 288 acres (Gold Line – Memorial Park) to 581 acres (VTA Light Rail – Ohlone-Chynoweth). The figures in this table are adjusted to the half-mile radius (502 acres), assuming a uniform density. In most instances, this increases the amount of housing but for some (Ohlone-Chynoweth and Willow) it reduces it.

** Assessed against BART threshold (3,850 units).

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APPENDIX C

DIRECT RIDERSHIP MODELING

Appendix C – Direct Ridership Modeling

Another method of analyzing the ridership impacts of transit-oriented development comes from new modeling methods. These direct ridership models also provide an important way to quantify the different trade-offs in station area planning – for example, through analyzing how much feeder bus service or how many residential units are needed to generate as many riders as a commuter parking space. MTC is making available a spreadsheet version of the model, which can be used in future station area planning and corridor planning efforts.

Rail ridership in the 3434 corridors is being forecast with region-wide travel demand models. This is appropriate, since travel demand for regional rail is a function of the location and attractiveness of destinations throughout the region. However even a well-calibrated regional mode-choice model cannot easily evaluate micro-scale station area characteristics that affect transit ridership and station access (e.g. changes within Traffic Analysis Zones). By contrast, Direct Ridership Models:

- Avoid insensitivities of even state-of-practice four-step models to reflect effects of localized conditions within communities and transit station areas (i.e. at the TAZ level).
- Provide a predictive method based on existing rail transit service and with demonstrated ability to match ridership relationships measured on those services.
- Accommodate data and budget limitations that preclude the updating and running regional models multiple times to examine numerous options at each station.
- Can be used to adjust official ridership forecasts to reflect changes in station area conditions or plans.

Adjusting official forecasts based on changes to station area land use and access (e.g. parking and feeder bus service) is the primary purpose of the Direct Ridership tools developed for this evaluation.

Derivation and Use of the Station Ridership Adjustment Models

The models were developed based on statistical analysis of independent variables related to year 2000 boardings and alightings counts at Bay Area Rapid Transit (BART) and Caltrain commuter rail stations. GIS-based demographic, employment and land use data was also developed for over 30 prospective independent variables believed to potentially be correlated with station ridership, both individually and in combination.

A total of nine regression models were developed to adjust rail ridership based on individual station area characteristics. Individual models were devised to predict the effects of the independent variables on AM peak, PM peak and off-peak BART ridership; these are summed to predict daily ridership effects. The model developed for commuter rail predicts morning peak period ridership only. Mode of access models were developed using BART data; these are generally applicable to commuter rail station area analyses as well.

Figure C-1 indicates variables shown to have a statistically significant effect on station ridership, and which are included in one or more of the ridership adjustment models.

Figure C-1 Station Area Variables that Influence Station Ridership

Population Within One-Half Mile	Post-High School Students Enrolled Within One Mile
Non-Retail Employment Within One-Half Mile	Percent Of DUs Within ½ Mile that are Multifamily
Retail Employment Within One-Half Mile	Bike parking spaces (racks + lockers)
Station Catchment Population (Beyond ½ Mile)	Freeway Intercept Station? (Yes or No)
Peak Period (6 – 9 Am) Feeder Buses/Shuttles	Downtown San Francisco Station? (Yes or No)
Parking Spaces At Station	San Francisco Residential Station? (Yes or No)
Peak Hour, Peak Direction Trains	No Parking at Station? (Yes or No)

Source: Fehr & Peers, 2006.

Application of the Direct Ridership Models and Illustrative Results

Figures C-2 through C-7 illustrate the effects of station area variables on rail ridership. Baseline station data for this illustrative analysis was taken from a representative suburban BART station. Because the Direct Ridership Models are based on statistical relationships derived from the full group of existing BART stations, the illustrative estimates are transferable to any existing or planned BART station. For the commuter rail analysis, values were based on a typical station in the SMART corridor.

Figure C-2 indicates that for BART, nearly 3.5 residents, or between one and two dwelling units, must be added to the station area to compensate for the negative ridership effect of removal of one parking space (without replacement). Since a parking space requires approximately 350 square feet, TOD development must be high-density – one resident per 100 square feet or 400 residents (about 150 to 200 dwelling units) per acre – to fully overcome the loss of parking, all else equal. BART's policy for its existing stations requires one-for-one replacement of parking spaces removed to accommodate station-site development. As Figure C-2 shows, adding 1380 residents (about 500 dwelling units) within a half-mile radius of the station, without allowing a net loss of parking, would increase average station ridership by about 4%. Developing the 550 units while eliminating 400 parking spaces would result in no gain or loss in daily ridership. At an average density of, for example, 55 units per acre, this scenario translates to converting 10 acres to housing while replacing about 850 (68%) of the 1250 parking spaces that would otherwise reside on the 10 acres.

Figure C-3 indicates that both parking removal and additional TOD residents serve to reduce the share of rail patrons using autos to access the station. For example, replacing 400 parking spaces with 550 dwelling units (1380 residents), would produce a 5% reduction in AM peak period auto access mode share.

Figures C-4 indicates that only 0.6 residents must be added to compensate for the negative ridership effect of removing one parking space if feeder bus service to the station is simultaneously increased. Again assuming 350 square feet per parking space, TOD

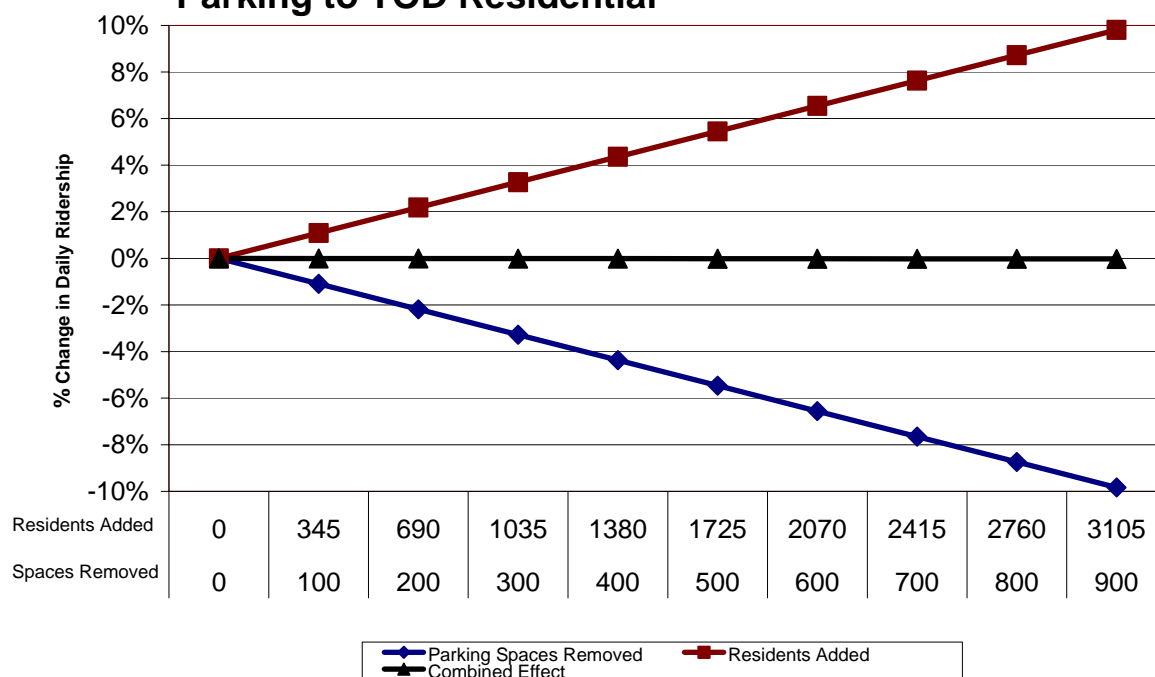
development need only be moderate density – one resident per approximately 600 square feet or about 75 residents (30 dwelling units) per acre – to fully overcome the loss of parking, as long as one feeder bus is added for each 100 parking spaces removed. For example, replacing 400 parking spaces with 240 residents (about 100 dwelling units) and adding four feeder buses to serve station access would sustain existing station ridership.

Figure C-5 indicates that the additional feeder bus service would further reduce the share of rail riders arriving by auto. In the scenario described above (replacing 400 parking spaces with 100 dwelling units and 4 feeder buses), overall ridership would remain stable and auto-access mode share would decline by 4%.

Figure C-6 indicates the trade-off between residential and employment uses: assuming a 50-50 mix of retail and non-retail employment, each station area employee correlates to the same amount of daily ridership as 2.9 station area residents (roughly one household). It should be noted that a variety of studies have found that employment uses should ideally be within one-quarter mile of a rail station to promote rail ridership. It should also be noted that the database used for the model includes employment centers in downtown Oakland and San Francisco; employment on more suburban corridors with free parking and good freeway access could be expected to generate less ridership.

Figure C-7 illustrates the trade-off between parking and residential uses for commuter rail. The relationship appears similar to that seen for BART in Figure C-2; just over four residents must be added to compensate for the negative ridership effect of removal of one parking space. It should be borne in mind that these results are not directly comparable since the commuter rail model predicts AM ridership, and the BART models predict daily ridership. It has been found in studies of BART ridership that housing is more productive than parking during the rest of the day beyond the AM peak. As with BART, the addition of feeder bus service would reduce the need to replace parking to maintain ridership.

The station ridership adjustment models have been implemented via a set of Excel spreadsheets. Use of the models is straightforward, and results are immediate. The models are ready to use to assist station area planners in devising and revising station area land use and access plans.

Figure C-2 Effect on Daily BART Ridership of Converting Station Parking to TOD Residential**Figure C-3 Effect on BART AM Auto-Access Share of Converting Station Parking to TOD Residential**

(Effect is the same for Commuter train, but Percentages will vary depending on station characteristics)

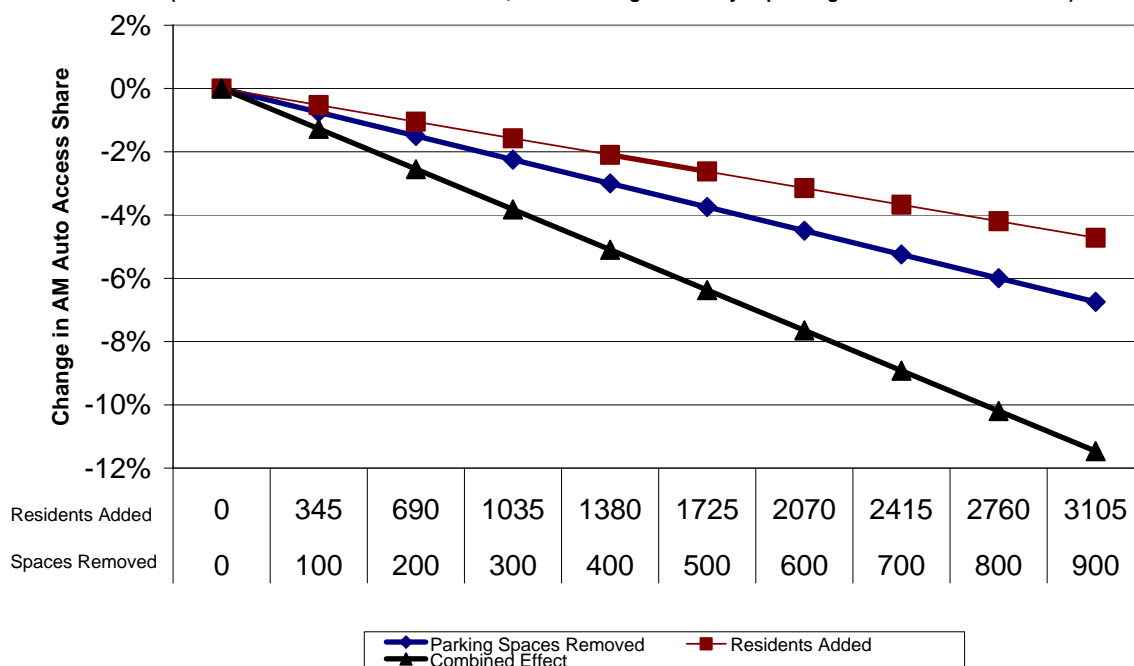


Figure C-4 Effect of Increasing Feeder-Bus Service to Compensate for Converting Parking to TOD Residential – *Effect on Daily BART Ridership*

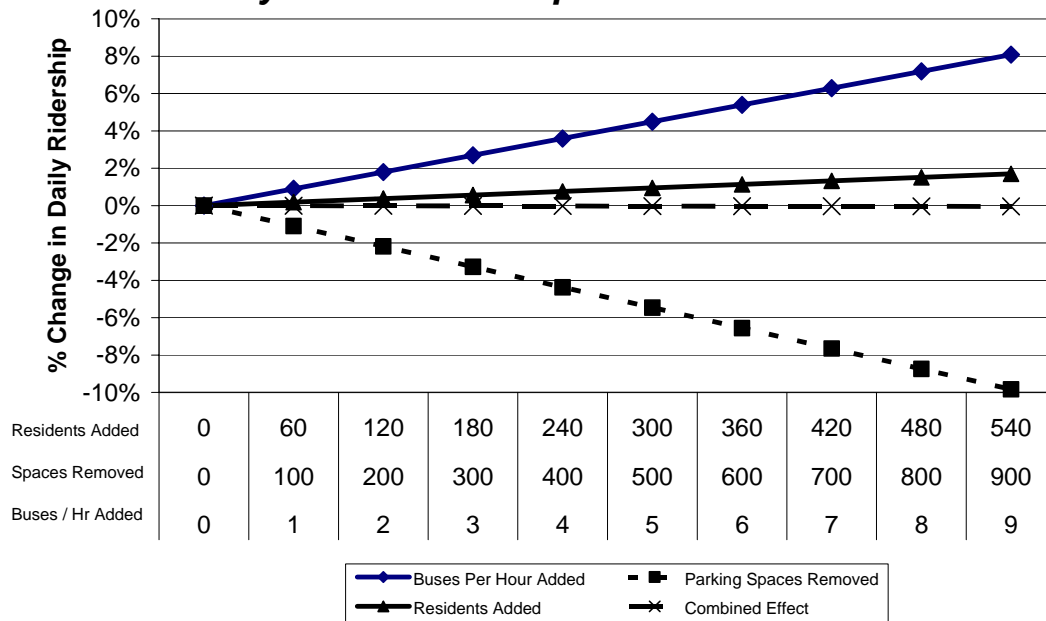


Figure C-5 Effect of Increasing Feeder-Bus Service to Compensate for Converting Parking to TOD Residential – *Effect on AM BART Auto-Access Share*

(Effect is the same for Commuter train, but Percentages will vary depending on station characteristics)

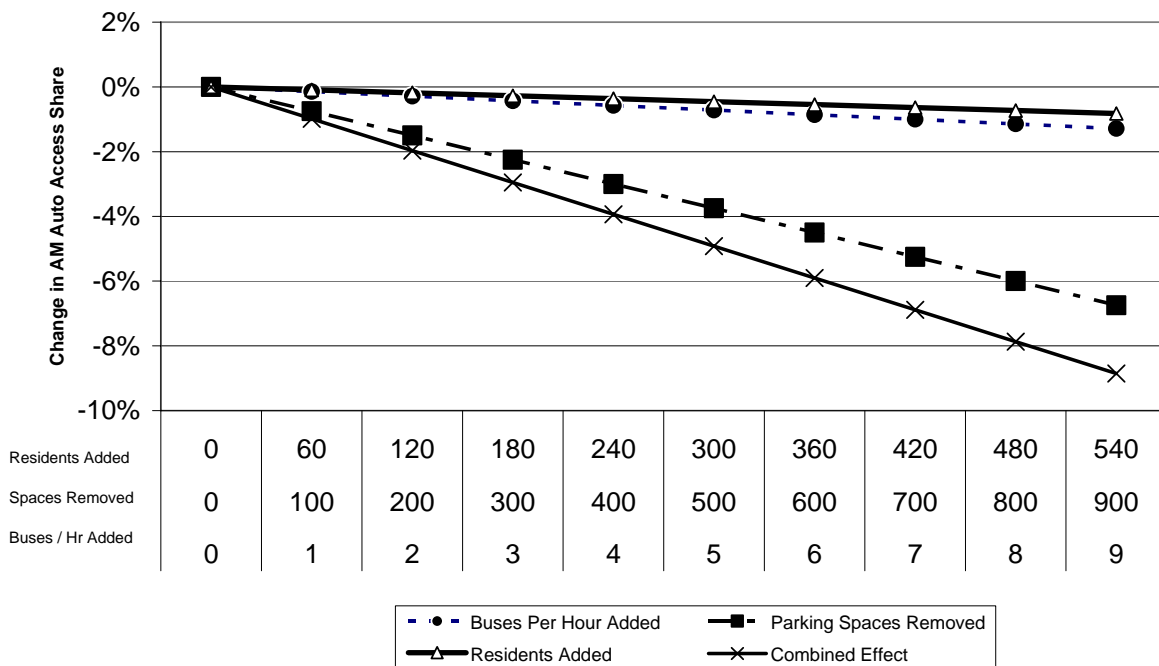
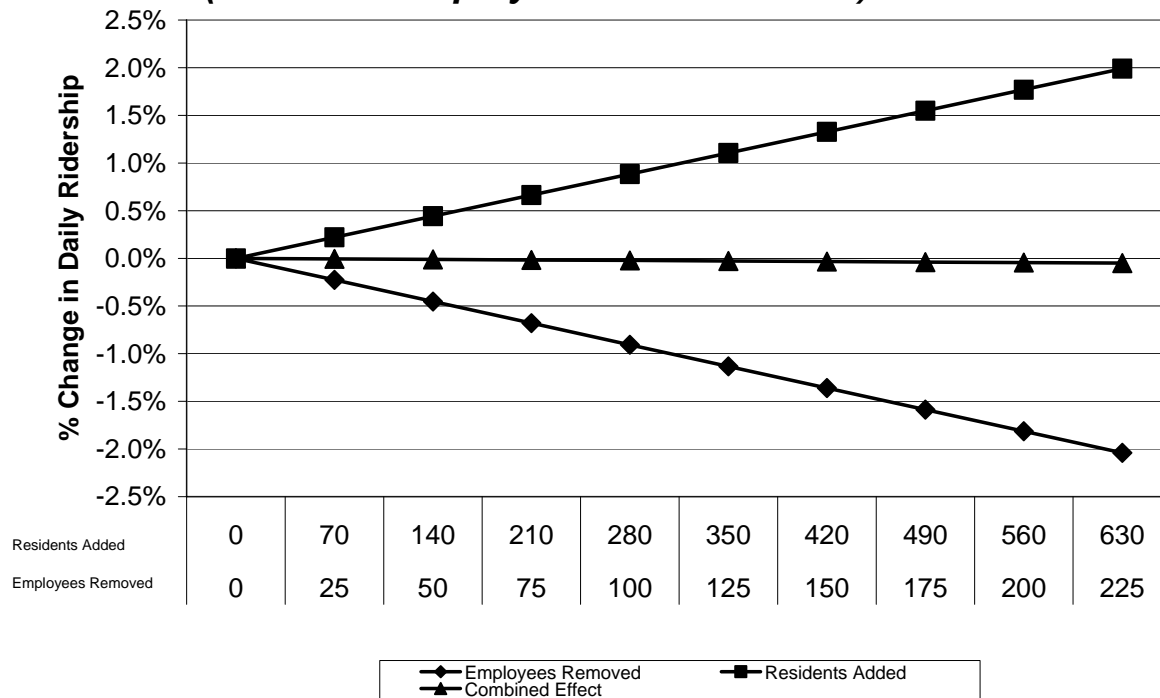


Figure C-6 Trade-off Between Adding Housing versus Employment Uses Effect on Daily BART Ridership*(Assumed Employment is 50% Retail)***Figure C-7 Effect of Parking / TOD Residential on AM Peak Ridership - Commuter Train Station**